Architectural Design Quality in Local Authority Private Finance Initiative Sheltered Housing Projects:

The Development of an Evaluation Tool

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Architectural Design Quality in Local Authority Private Finance Initiative Sheltered Housing Projects:

The Development of an Evaluation Tool

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Abstract

Ever since the 1990s, when the Private Finance Initiative (PFI) was developed as the primary method for delivering major public-sector capital projects in the UK, it has been severely criticised for the lack of design quality in the buildings that it produced. The main driver for this thesis was to redress that situation. The development of an Architectural Design Quality Evaluation Tool was based on a live project with a metropolitan council in the North East of England. The aim was to improve the design quality of schemes that had been submitted through a PFI to replace the council's entire sheltered housing stock. The Tool has two functions. It was a substantial part of the assessment process, which selected the preferred bidding consortium from the original six bidders, through a series of stages. However, it was also directed at improving the quality of all submitted designs through an iterative process. While existing tools provide useful benchmarks, and some offer means of structuring an evaluation, none are totally applicable in the context of PFI competitive bidding processes. Moreover, the existing tools are good for evaluating performance attributes of buildings, and these are important, but do not substantially tackle the less tangible amenity attributes that are vital to engendering the feeling of home. This Tool emphasises the amenity attributes without neglecting performance, thus generating a design quality hierarchy. The criteria for assessment are derived from academic publications. In order to reflect the hierarchy, each criterion was weighted on a scale of one to five, in accordance with multivariable utility theory. The percentage allocation to each main heading of the Tool was determined by the local authority Project Team. A User Guide was developed to assist the evaluation of schemes. The Tool itself was appraised at the final stage, assisting the selection of the preferred bidder. The designs were evaluated in three reviews, thus providing 156 results. The Tool and its development have been published, and the Tool and the User Guide accepted by the Homes and Communities Agency as an example of good practice. Both currently appear on its website. The Tool continues to assist other social housing providers with the design quality of their own projects.

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List of Accompanying Materials

- CD of the Tool and User Guide
- Quick Reference (QR) Codes for the Tool and User Guide

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Declaration

I declare that the work contained in this thesis has not been submitted for any other award and that it is all my own work. I also confirm that this work fully acknowledges opinions, ideas and contributions from the work of others. The work was done in collaboration with the North Tyneside Council.

I declare that the Word Count of this Thesis is 61,007 words (excluding the Tool and the User Guide)

Name: Monika Sharma

Signature:

Date:

Summary of Outputs

Paper in *Building Research and Information*, 41 (6), pp. 690-705
http://www.tandfonline.com/doi/pdf/10.1080/09613218.2013.775895

CIB World Congress paper 2013
http://nrl.northumbria.ac.uk/11181/1/CIB_2013_Paper.pdf

CIB World Congress paper 2010
http://nrl.northumbria.ac.uk/2721/1/Architectural_Design_Quality.pdf

Homes and Communities Agency – good practice
http://www.homesandcommunities.co.uk/architecturedesign-quality-evaluation-tool

Finalist, National Co-ordinating Centre for Public Engagement Awards 2014

Chapter 1: Introduction

Chapter 1: Introduction

1.1 Background to the Study

An ageing population represents one of the most extraordinary social transformations that has characterised and will continue to characterise British society. The age profile of the country's population will change significantly and will become older. By 2026 there will be 2.4 million more older households than there are today, and older people will account for almost half (48 per cent) of the increase in the total number of households in the country (North Tyneside Council, 2007). The anticipation of living longer and the increase in the number of elderly citizens represents challenges for national and local services.

Meeting the needs of an ageing society is a particular challenge in the provision of houses. Central government has identified this issue as an area where significant changes need to be made, not only in the actual building of homes but also in the nature of housing for older people. With an increasing elderly population, additional accommodation is needed that will continue to support an established quality of life. Therefore, more effective ways of providing for this sector of the population and its needs are a priority. At the same time, a reduction in the capacity of local authorities has seriously curtailed their ability to afford capital projects on this scale. The procurement of publicly funded construction projects has changed significantly over last 25 years. Up to the beginning of the 1990s, almost all public-sector projects were funded by central government, and many were enacted through local authorities. Procurement was mainly traditional, with consultants commissioned to prepare designs and specifications for building works, and contractors appointed following competitive tenders.

In recent years, central government has decided not to fund projects in this way. It is debatable whether they cannot be afforded, or whether this is a political decision (Dixon et al., 2005). Completely new procurement methods and financing systems have evolved. In nearly all cases, private finance became the preferred alternative, so that the burden of the initial expense of

capital projects for the public sector could be reduced. One such system, the Private Finance Initiative (PFI), was introduced in 1992. It is like no other type of building procurement, as private consortia bid to construct and operate facilities for up to 30 years. The successful consortium is responsible for providing an integrated service to gather the necessary consultants and contractors for the design and construct large building projects. They are responsible for the ongoing maintenance and facilities management over an agreed contract period, usually of 25 to 30 years (Akintoye, 1994). For ongoing services, they are paid an annual sum agreed at the beginning of the project. This represents a risk transfer to private consortia (Bing et al., 2005), and a structure in which successive Governments have claimed that value for money is optimised (Khadaroo and Abdullah, 2007).

1.1.1 **Critique of Private Finance Initiative**

PFI actually received criticism from the very beginning. Introduced by a Conservative government, the Labour opposition immediately labelled it totally unacceptable, proclaiming it to be an extension of the privatisation of public services, (Shaw, 2007). Upon being elected to govern in 1997, Labour set up a review of PFI. It made what it believed to be some fundamental changes based on the review. Under the new procedures, government stated that PFI was now able to provide:

- investment in the public infrastructure that would not otherwise have been possible
- greater value for money
- higher quality projects (Robinson, 1998)

Quality can be an elusive term, and the Royal Fine Art Commission did not shrink from expressing its reservations in relation to PFI. It argued that there were inherent dangers in concentrating responsibility for designing, building, financing and operating a building on one service provider. It continued that it also contains a serious flaw as an approach to procurement – if the brief is filtered through intermediaries whose interests lie elsewhere (particularly in profit making) then the prospects for high-quality architecture must surely be compromised (Fawsley, 1997). The architectural community was also

suspicious of these new forms of procurement from their inception, although it could be argued that it was because the architects' influence was being diminished by them (Barlow and Koberle-Gaiser, 2009; Purves, 2009). Even those who tried to engage with the new system, such as leading architect Malcolm Fraser, eventually decided to resign as Deputy Chairman of Architecture and Design Scotland stating that 'the best PFI schools are not good enough and the worst fill me with despair' (http://www.bdonline.co.uk/fraser-quits-ads-in-pfi-protest/3081147.article, 2007). Fellow architect Alan Dunlop added, 'I think it's a good thing that he's used this opportunity to highlight how poor this procurement system is', and Douglas Read, President of the Royal Incorporation of Architects in Scotland, noted that he had consistently raised the problems of PFI with the Scottish Executive (Hurst, 2007). The most extensive experience in this procurement method has been in primary health care and secondary education. PFI in housing has taken much longer to become established and therefore does not have the same body of user feedback. However, pressure groups have little doubt that the products are becoming increasingly unpopular with tenants (http://www.defendcouncilhousing.org.uk/dch/dch_infopage.cfm?KWord=PFI, no date).

The Royal Fine Art Commission was succeeded as the government's adviser on architecture by the Commission for Architecture and the Built Environment (CABE) in 1999. The new commission was almost as unequivocal as its predecessor had been. It noted that the UK was witnessing the largest public-sector construction programme for a generation, through three preferred procurement routes: Design and Build, Prime Contracting and the Public Finance Initiative, none of which promoted design quality as a major focus. It then added that the vast majority of PFI buildings commissioned to date had not been designed to a high enough standard and public service delivery has suffered as a result; and that qualitative improvement of this approach was urgently needed (CABE, 2005b). Amongst its proposals to generate this improvement were:

- appointing client design advisers
    - a Design Champion

    - independent advisers
    - a Users' Group
- studying design exemplars
- undertaking post-occupancy evaluation and feeding into future briefing documents and output specifications

Within two years of the CABE report, a Treasury Taskforce (2007) published its technical note on how to achieve design quality in PFI projects. The stated aim was to assist public-sector procurers to ensure the highest design quality solutions. It highlighted the following three areas for attention:

1. Management of the relationships with bidders, by introducing competitive dialogue procedure.
2. Provision of clear information early in the competition about what was required and how bids would be evaluated.
3. Ensuring that design requirements were consistent with the budget available for the project.

The government was seeking a much improved process, one which it hoped would answer the critics about the design quality of PFI projects. Arguably, the biggest procedural change was in the management of relationships with bidders. The competitive dialogue procedure was introduced following an EU Directive (2004/18/EC) enabling authorities to discuss all aspects of proposed contracts with the bidding consortia. Such dialogue had not been possible under the previous restricted procedures. In principle, dialogue was to be allowed with consortia to identify and define solutions required by the authority. This could be conducted in successive stages with the aim of reducing the number of bidders. Under the new provisions, an authority could also discuss bidders' proposals for solutions, provided all bidders were treated equally (Office of Government Commerce, 2006). At last, authorities could review design quality with bidders during the process.

1.1.2 **The Project**

North Tyneside Council, a large metropolitan local authority in the North East of England, faces a particularly radical social change with housing stocks

that are unlikely to meet future needs. Therefore, the council included in its strategic plan (North Tyneside Council, 2007) provision to replace its entire sheltered housing stock with ten new build developments and 16 refurbishments. The intention was to increase both the quantity and quality of its provision. The council concluded that the only feasible method of funding this huge transformation was through PFI. The council succeeded in gaining over £112 million PFI credits to put towards the cost of the project, including operation and maintenance. The programme imposed by central government demanded intense activity (see Table 1.1); but from the beginning, the council was keen to produce high-quality buildings, irrespective of the quick turnaround, and despite the criticisms that public buildings procured through PFI had received.

Table 1.1: Original programme

January–April 2010:	Stage 1 - assess sample outline proposals from six bidders; select three bidders for Stage 2
April–July 2010:	Stage 2 – assess sample detailed proposals from three bidders; select two bidders for Stage 3
July 2010–January 2011:	Stage 3 – assess all detailed proposals from two bidders, i.e. 10 new builds and 16 refurbishments; select preferred bidder
January–April 2011:	Evaluate full proposals from preferred bidder
April–July 2011:	Complete process, sign contract with preferred bidder
October 2011:	Start on site

In order to achieve its objectives, the council decided to follow closely the recommendations of CABE (2005) and the Treasury Taskforce (Office of Government Commerce, 2007). It therefore proposed the following:

Appointment of Client Design Advisers

Design Champion

The Design Champion does not need to have experience of construction projects but must have the presence within the project to keep design quality as a vital shared goal and will need to learn about design issues that are relevant to the project.

The council responded by appointing the deputy elected mayor to the role of Design Champion, stating that he would be committed to design quality in its broadest sense (North Tyneside Council, 2007). Essentially, the role of the Design Champion is to articulate the vision and desire for high-quality design, to formulate the authority's aims and ensure they are clearly stated in the briefing documents. He is also to define, check and evaluate quality throughout the process, and insist that quality is maintained throughout the project (Office of Government Commerce, 2007). The council considered that the deputy elected mayor would act as an independent chair and could keep design at the top of the political agenda. Further, his significant status could ensure that highly rated schemes would be protected and the agenda of upholding design quality could be shared by the different departments within the council.

Independent Advisers

There was recognition of a deficiency in design expertise in North Tyneside Council, primarily due to it disbanding its architects' department. The council approached the Architecture Group at Northumbria University. This initiative established a partnership in which the university would advise the local authority on design issues related to this project. It provided an opportunity to form what is known as a Knowledge Transfer Partnership (KTP), through funding by the Technology Strategy Board, the Arts and Humanities Research Council, and the local authority itself. KTPs provide resources and expertise to organisations that desire to innovate, and improve their performance. As part of this KTP initiative, an associate was appointed to work on the project as a researcher. The associate was also invited to register for a PhD, supervised by the same two members of university staff who were advising the council.

Users' Group

According to both CABE (2005) and the Office of Government Commerce (2007), users should be directly consulted. A group should be established that would be representative of different user groups (such as residents, staff and visitors) and would assemble information about user requirements, as

well as feeding back to all users on progress. There are two principal arguments for user involvement in design decisions, as without consultation:

1. the decisions are more likely to produce unworkable designs;
2. there could be dissatisfaction and resentment if there are issues with the completed buildings and the users' opinions had not been sought (Halpern, 1995).

North Tyneside Council established a Users' Group comprising: the Assistant Project Manager and Lead Communication Officer (from the authority); eight members of a tenant focus group (the local authority existing sheltered accommodation); representatives of the local community over 50 years of age (four members); representative of North Tyneside Coalition for Disabled People; a manager of the local Alzheimer's Society; a representative of the Coalition for Older People; and a representative of the Primary Care Trust.

The biggest and the most important group, in the consultation, were residents of the existing facilities, so that they could pass on their views about what worked and what did not work in the existing provision. It was important that there was a fresh perspective, with some younger members of the community offering their opinions. Thus local people over 50 years of age who could well be using these facilities in future were included. Others involved were individual representatives of various important groups who could offer specialist advice.

In order to elicit users' aspirations, a number of design workshops with the Users' Group were organised. They were based around the themes of communal facilities, sustainability and internal details.

In the event, the project was substantially delayed by a Mayoral Review and the Government's Comprehensive Spending Review, which had implications for the PhD programme (see Figure 1.1)

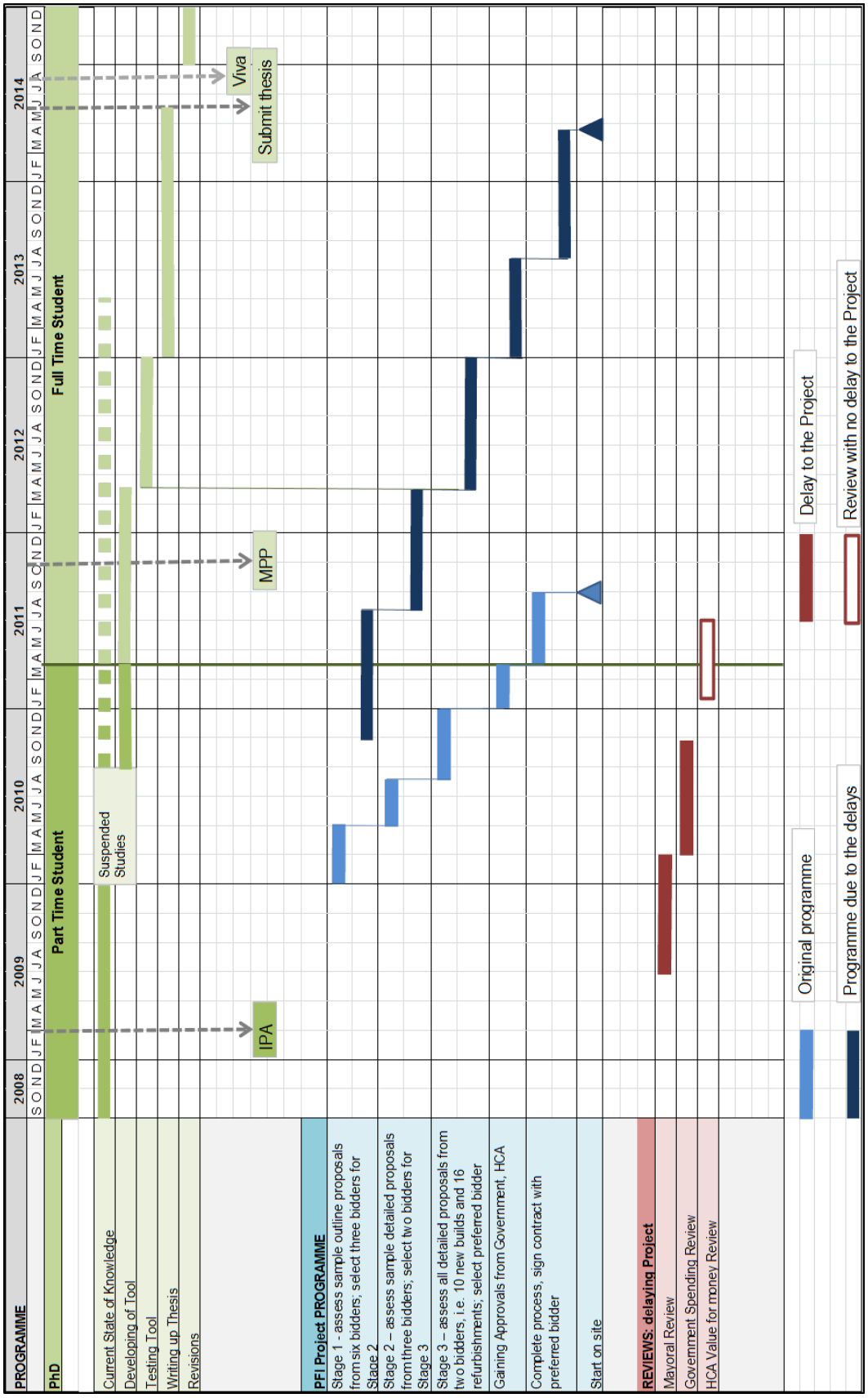

Figure 1.1: Timeline of the Project and PhD

1.2 Current State of Knowledge

1.2.1 Quality and its Assessment

Design quality in architecture covers a mixture of complex issues regarding a building's enduring and aesthetic qualities (Volker et al., 2008). Thus it is difficult to evaluate. There is a general acceptance of positivist doctrines, in that objective criteria should be the principal means of assessment. However, architecture may involve less tangible attributes, for which consensus may be necessary (Giddings and Holness, 1996). In considering how to assess design quality, different perspectives are evident. Burt (1978) identifies that the two main categories are performance and amenity. Nevertheless, it is clear that most assessments of design quality mechanisms rely only on performance measurement. This approach has its roots in monitoring manufacturing sector output, subsequently translated and adapted for use in construction (Gann et al., 2003).

1.2.2 Application of Architectural Design Quality in Britain

There is an argument that promotion of design quality in the UK built environment has always been fragmentary and weak. The Royal Fine Arts Commission was set up in 1924, but it had little political support, and it was only partially concerned with design quality, as it had other matters to consider. In addition, there were Department of the Environment guidance notes, but these were mainly involved with development control in planning and only occasionally addressed design quality issues.

The period from 1997 to 2010 represented a radical change in direction. The new Labour government made a real commitment to design quality, through setting up early initiatives such as Richard Rogers' Urban Task Force (1998 onwards) through to the most significant strategy: setting up CABE. This was a major investment in design quality through a coherent structure. However, in a claim to 'cut red tape' and reduce bureaucracy and regulation, in 2010, the Conservative government introduced a comprehensive Spending Review alongside a commitment to reduce the number of quangos (quasi-autonomous non-governmental organisations). One of the casualties was

CABE, which lost its funding and now has substantially less influence as a component of the Design Council, where it largely operates on a voluntary basis with little support.

There are still a number of award schemes in operation that recognise architectural design quality in Britain. However, they apply to completed buildings, and are therefore not relevant to the evaluation of designs in progress. There are also existing quality evaluation mechanisms: these will be reviewed in this thesis.

1.3 Aim and Objectives

The aim of this research was to establish a process that will deliver design quality in local authority PFI sheltered housing projects. The following objectives were originally designed to address the perceived limitations of the PFI procurement process as well as methodological issues. The aim of this study still holds true. However, the specific objectives have been refined as the research evolved to focus on the development of a structure and tool that could be used to assist the aim of maximising design quality. It is these objectives that are represented below.

The objectives of the research were to:

1. Critically evaluate the PFI process adopted by North Tyneside Metropolitan Borough Council (MBC), including the competitive dialogue and user consultation for its 26 proposed sheltered housing schemes.

2. Explore an exemplar PFI project that has been awarded prizes for its design quality, reflect on the output specification and issues that determine quality.

3. Compare the process that could be adopted by North Tyneside MBC in their projects following study of the exemplar.

4. Appraise designs for North Tyneside MBC sheltered housing schemes in relation to quality criteria.

1.4 Research Methodology

1.4.1 **Context**

The circumstances that led to this thesis provided a rare opportunity in terms of PhD study. The local authority had secured a large-scale PFI project and was seeking a process that would deliver high design quality in its proposals. It was a completely new venture for the council and, therefore, the research methods were often exploratory – developing as the live project itself developed. The initial methods proposed by the council's Project Team were based on CABE's (2005) recommendations as shown in section 1.1.1.

It was in the category of appointing an independent adviser that the opportunity for the PhD study was presented. The council approached the Architecture Group at Northumbria University, who concluded that the optimum strategy would be to base a researcher in the council's Project Team. Thus, the methods used by the researcher were aimed at creating mechanisms for delivering high design quality, some of which specifically involved carrying out CABE's recommendations and some were related to interaction with others such as the Users' Group and the Project Team itself.

1.4.2 **Research Philosophy**

All research methods are directed by philosophical notions about the nature of reality. Generally, these range from a positivist perspective to an interpretivist viewpoint. The positivist perspective holds certain assumptions about truth and reality. Fundamentally, it uses analytical and scientific tactics and involves language such as numerical analysis and measurement of variables that emphasise objectivity, neutrality, measurement and validity. The alternative view, interpretivism, considers that there is no single accurate route or precise method to developing knowledge (Willis, 1995). The interpretivist paradigm emphasises the need to put analysis in context (Reeves and Hedberg, 2003). Further, it reflects on the experiences of individuals. Thus, this paradigm favours qualitative methods, such as interviewing or observations that may be governed by a relationship between the researcher and the subjects. Table 1.2 shows a brief comparison of

positivist and interpretivist approaches, their philosophical basis, possibilities and the ways that a researcher should consider them in research design through to ideal methods.

Table 1.2: Comparison between positivist and interpretivist approaches

	Philosophical basis	Possibilities and what researcher should do	Ideal methods
Positivist quantitative	The world is external Researcher is independent	Base research on quantifiable evidence Measure phenomena Look for relationship between causes and effects. Constructed on hypothesis Reduce phenomena to simplest elements Describes how relationships operates Outcome-oriented Analytical – particularistic approach	Quantitative methods Operationalising concepts so that they can be measured Taking large samples Achieved by observation and experiment Outsider's standpoint; distanced from the data Using concepts
Interpretivist qualitative	The world is socially constructed Researcher is part of it	Focus on meanings Understanding of phenomena Look for totality Develop ideas Determines insight, morals, and belief systems Process-oriented Holistic approach	Qualitative methods to gather broader information outside readily measured variables Using multiple methods to establish different views of phenomena Generally small samples Samples studied over time Insider's standpoint; close to the data Using various perspectives

Source: Gilbert, 2008; Cavana et al., 2001; Deshpande, 1983

1.4.3 **Analysis of Research Methods for this Study**

In reflecting on the comparison between the two approaches (Table 1.2), it is evident that elements of either or both would be applicable to this study.

There were times when the researcher needed to be independent, especially when the proposal was being tested. There was a notion that the research needed to be based on quantifiable evidence, the output specification being the only existing document that determined standards for the project. The work was certainly outcome-generated, as buildings with high design quality were required. However, some of the methods, such as taking large samples, would not be applicable. Conversely, the researcher needed to be immersed in the process, so as to understand all the influences at play. The focus was actually on the users. Potential accolades about the completed buildings would be meaningless if the users could not relate to the designs. Thus, different viewpoints became important. Arguably, the most significant aspect is information that is outside readily measurable variables. Despite the doctrine epitomised by Pateman (1986: 26) that, '*You must be able to measure quality – if you do not you will never know whether or not you have got it*', an alternative viewpoint has considered that there is more to design quality than just performance. Burt (1978), Giddings and Holness (1996) and others have suggested that there are less quantifiable amenity attributes that may be important to the users' concept of home. The methodological challenge is to avoid accusations of subjectivity and matters of opinion by constructing justifiable techniques that can evaluate indicators of amenity value.

This research has therefore adopted a mixed methodological approach, combining quantitative and qualitative methods where diverse data collection strategies and analyses were used at different stages of the study. Table 1.3 summarises quantitative and qualitative methods with respect to a belief system, research purpose and the researcher's role. The aim was to achieve a situation in which the blending of both quantitative and qualitative methods could inform design quality evaluation (Nau, 1995).

Table 1.3: Quantitative and qualitative methods

	Methodology	Belief	Research purpose	Researcher's role
Quantitative	Works realistically (Low, 1987) Varieties of positivism (Philips, 1983)	Single objective reality	Establish relationships between measured variables	Objective observer who neither partici-pates in nor influences what is being studied; onlooker
Qualitative	Interpretative (Bernstein, 1976) Characterised by humanism and contextualism (Low, 1987) Phenomeno-logical, hermeneutical, experimental, dialectic (Hathaway, 1995)	Multiple realities (Davis, 2003) Become part of the situation by understanding views from participants (Hathaway, 1995)	Understand a social situation from participants' perspective (Foddy and Foddy, 1994)	Researcher participates in the research and the social setting; actor (Creswell, 2009)

The majority of the interactions with the Project Team were carried out through participant observation, i.e. in the council's PFI process, including the competitive dialogue, and feedback on the various iterations of the proposition, especially in relation to the criteria. This is one of the most common methods for qualitative data collection and requires that the researcher becomes a participant in the culture and context being observed. Participant observation has its roots in anthropological studies. It involves participating in a situation, while at the same time, documenting what is being observed. The notion is that the observer can study the experiences of the subjects in a particular situation first-hand, day-to-day. However, the degree to which the researcher participates in the activities of the people they are studying differs from project to project and has been much discussed (e.g. Adams, 1960; Bryman, 2008; Bryman and Burgess, 1999). Figure 1.2 demonstrates the continuum. In this case, as the researcher was solely responsible for constructing a mechanism to improve design quality,

the position on the continuum would probably be between complete participant and participant as observer.

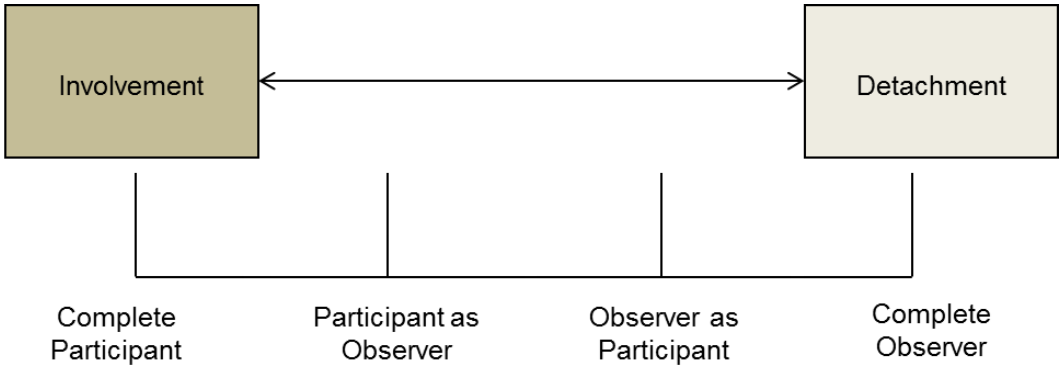

Figure 1.2: Gold's (1958) classification of the participant observer role

One of the advantages of participant observation is the prolonged immersion in the setting, which makes the researcher well equipped to see issues that would otherwise be challenging. It also allows for the informed consensus of participants (Jorgensen, 1989; Ruane, 2004).

The following stages of the research identify the various methods involved.

Theoretical Framework

This was based on the review of different kinds of literature, as a means of establishing the ideals to be achieved. Initially, philosophical literature was examined to provide insight on human needs, place, house and the developing concept of home. This was followed by review of a growing literature about older people's perspective of home. The physiological needs of shelter, comfort and security, together with the psychological needs of belongingness, status, self-esteem, privacy and notions of beauty formed the next section of the literature review in relation to accommodating older people. A reprise of the Quality Assessment Hierarchy was driven by two specific sources of literature on performance attributes and amenity attributes. The final section of the Theoretical Framework reviewed literature on the nature of sheltered housing, and whether it can provide for the physiological and psychological needs of residents within the concept of home.

Background to Building the Tool

The first consideration was whether a new tool was actually required. Thus an analysis of existing design quality evaluation tools was undertaken by collecting secondary data about the tools from their own providers, together with reflections on their nature, rigour and applicability contained in academic literature. Having established the need for a new tool, the methodology then focused on how it would be formulated. As the only PFI document containing quality data, the output specification was assessed to determine whether it could form the basis of the Evaluation Tool. It was concluded that as the output specification formed part of the contract documents, and the Evaluation Tool was intended for the design phase up to the selection of the preferred bidder, they needed to be separate documents. Nevertheless, it was also noted that co-ordination between the two would be advantageous and that the requirements of the output specification should be included in the Evaluation Tool as items that were required to be achieved. It was therefore important to determine whether the specification could provide the structure for the Tool. It has already been established that the local authority had decided to follow the recommendations of CABE (2005). One of the methodological stipulations had been to study design exemplars. In this case, one multiple-award winning, recently completed, sheltered housing scheme was selected for analysis of its attributes and applicability of the output specification to determine the structure. The analysis generated the final category headings for the Tool.

It was concluded that to assess the design quality of the proposals, the Tool needed to be criteria-based. Therefore, a methodology was required to elicit sub-headings and their statements, followed by the criteria themselves. The outstanding commitment to design quality demonstrated by the Labour government of 1997–2010 (Carmona, 2001) led to a review of relevant reports and guides from that period about the housing needs of older people and the design quality of the accommodation. The review revealed a significant number of publications that could be organised into categories, providing the sub-headings and their statements.

Developing the Tool

Publications had been analysed to establish themes under the sub-headings, and the themes fed into the Tool to generate the quality criteria. The crucial activity at this stage was to develop the criteria, against which the proposals would be assessed. The necessary rigour for the criteria determined that they should be derived from academic literature. A search of academic journal papers concerning human needs, place and house, in relation to home and accommodating older people offered 112 sources produced during the same period from which to derive the criteria. It is recognised that a selection process has taken place in the choice of literature. However, it is a process that explores the sources of recent research in this topic area.

The next part of the methodology was to explore appropriate scoring methods that would assist the accuracy of evaluations. It was identified in the literature that the most effective, simple and easy-to-use method that could be adopted was a Likert scale (e.g. Neuman, 2000; Maurer and Andrews, 2000). This is a psychometric scale frequently used in questionnaires, and is the most extensively used scale in survey research (Sudha and Baboo, 2011). It is acknowledged in Neuman (2000) that the numbers of points on the scale range from 2 to 20. Various combinations of size of scale were tested with the data, and it was discovered that a seven-point scoring scale produced the most consistent results.

As they were identified, it became clear that not all criteria had equal importance. There is a considerable debate about weighting in the literature. Sudha and Baboo (2011) state that Likert scales can be used in both assessment and weighting. The Likert scale is the most commonly used method in the social sciences, which further suggested the selection of this method. After testing, it was concluded that the criteria would be weighted on a scale of 1–5, with 1–3 allocated to performance attributes, and 3–5 to the higher level amenity attributes. It was determined that there should be a crossover at point 3, where performance meets amenity. As part of the commitment to participant observation, the researcher chaired a meeting of the Project Team, at which each criterion was debated and allocated a

weighting according to the consensus on where the criterion is positioned on the performance–amenity continuum. As a means of checking the allocation, it was decided to produce a mean weighting for each sub-heading. The hypothesis was that categories such as context, building form and communal spaces should predominantly demonstrate amenity attributes, whereas those such as entrances, service spaces and architectural components should predominantly represent performance attributes. Headings such as external space, circulation space and apartments present more complex balances of performance and amenity criteria. This hypothesis was supported by the mean weighting calculation and therefore the proposed weightings were accepted by the team.

Throughout the competitive dialogue, and especially the decision stages when six bidders were reduced to three, and three to two – feedback on the evaluations was discussed with the lead architects and project managers from the various consortia. This was all part of an iterative process, which enabled the researcher to review and refine the criteria during these stages.

In accordance with CABE's (2005) recommendations, the council had established a Users' Group. In the early stage of the project, three workshops were organised to elicit user priorities. Following each round of design evaluations, the researcher met with the Users' Group to feed back the nature of the designs and their evaluation. Members of the Project Team were also in attendance. The meetings were organised as focus groups, so that the users' views of the designs and evaluation could be elicited and taken forwards to the next round. This technique is useful in a number of ways. First, although the researcher may have some initial guiding questions or core concepts to ask about, there is no formal structured instrument or protocol for collecting feedback. Another useful benefit was that the researcher was able to follow up any issues raised by the group in detail. Consequently, focus groups are particularly useful for exploring topics. However, there may be issues due to the lack of structure. The sessions need to be carefully managed in terms of time and direction. Also, the weighting of the various points raised could be open to debate. For this research, the researcher and the Project Team reviewed the outcomes of the

focus groups, to ascertain the priorities of aspects discussed, along with the feasibility of incorporation into the schemes.

The Proposition

By the beginning of Stage 3 of the selection process, the Tool was complete and ready for testing. For purposes of objectivity and independence, the researcher now undertook the role of non-participant observer. Testing of the Tool was undertaken on the final designs of the two remaining bidders. Two schemes had already been tested as pilot studies to ensure the functionality of the Tool. The testing of the developed Tool presented analysis of the evaluation of design proposals at Stage 3 of the process, and contributed to the selection of the preferred bidder. The Scoring Group comprised four members of the Project Team, who were selected to assess all the schemes against the criteria. This involved 26 schemes from two bidders in three reviews – a total of 156 reviews. The three reviews enabled improvement in design quality, even at the final selection stage. Detailed adjustments to the Tool were undertaken as the result of the testing. Further feedback on the operation of the Tool was also obtained. The council had already produced its own report. Responses from the lead architects were sought from the two remaining bidders; a semi-structured telephone interview was conducted to obtain their views on the operation of the Tool, and the questions were sent in advance. The interviews were not recorded but responses to the questions noted. The justification for choosing semi-structured rather than structured interviews was because the former offer sufficient flexibility to approach various respondents differently while covering the same areas of data collection (Noor, 2008).

A summary of the research design is shown in Figure 1.3.

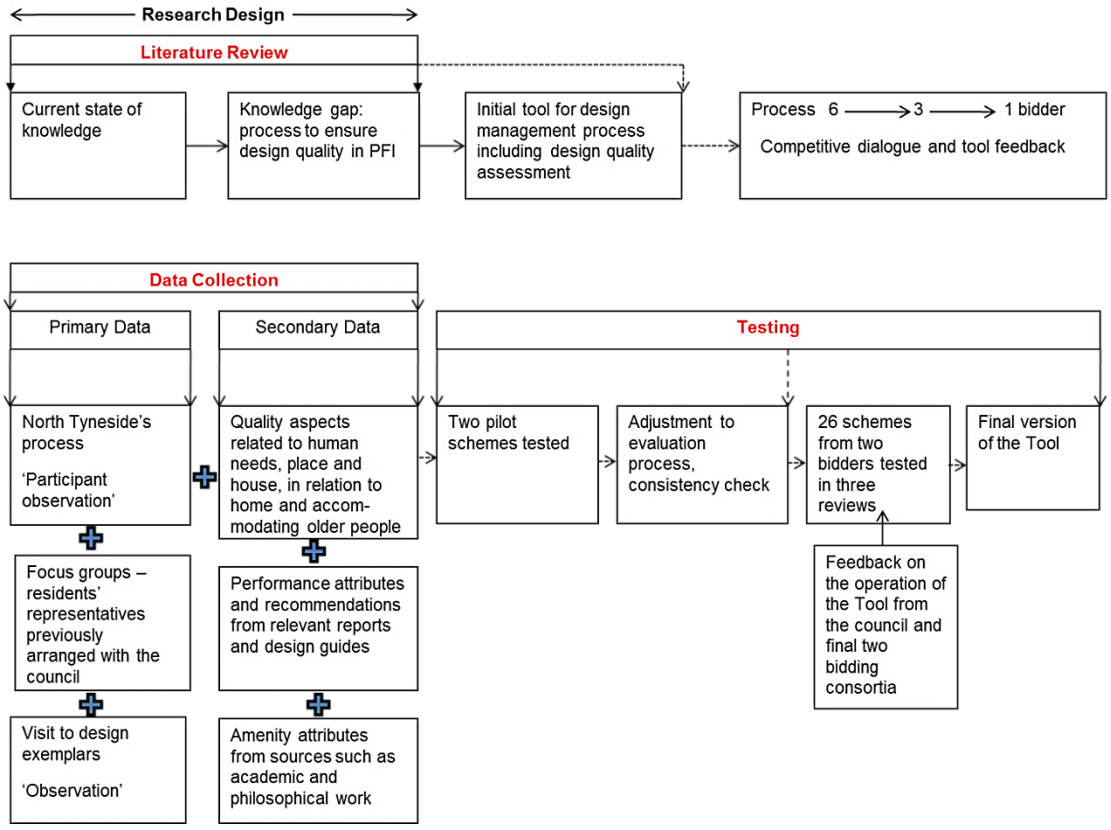

Figure 1.3: Summary of research design
Source: Author

1.5 Conclusion

This chapter has presented the context, current state of knowledge, aim and objectives, and research methodology. The aim was to provide a mechanism for improving design quality, which took the form of an Architectural Design Quality Evaluation Tool, using participant observation during a live research project with a metropolitan council in the north of England. The objectives were directed at improving the quality of design in residential sheltered housing, procured through PFI. Other research methods were tailored to specific parts of the investigation.

The following chapter focuses on the Theoretical Framework, i.e. research into the concept of home and quality of life, related to older people's needs. Chapter 3 is concerned with Background to Building the Tool, primarily developing its structure. The process of Developing the Tool is related in

Chapter 4, especially the establishment of the Sub-headings and Statements, Criteria for assessment, and Scoring and Weighting. The final chapter includes the proposal for the Final Tool, the User Guide and testing. It also includes proposed contributions to knowledge and some possible further research. A schematic representation of the research process is presented in Figure 1.4.

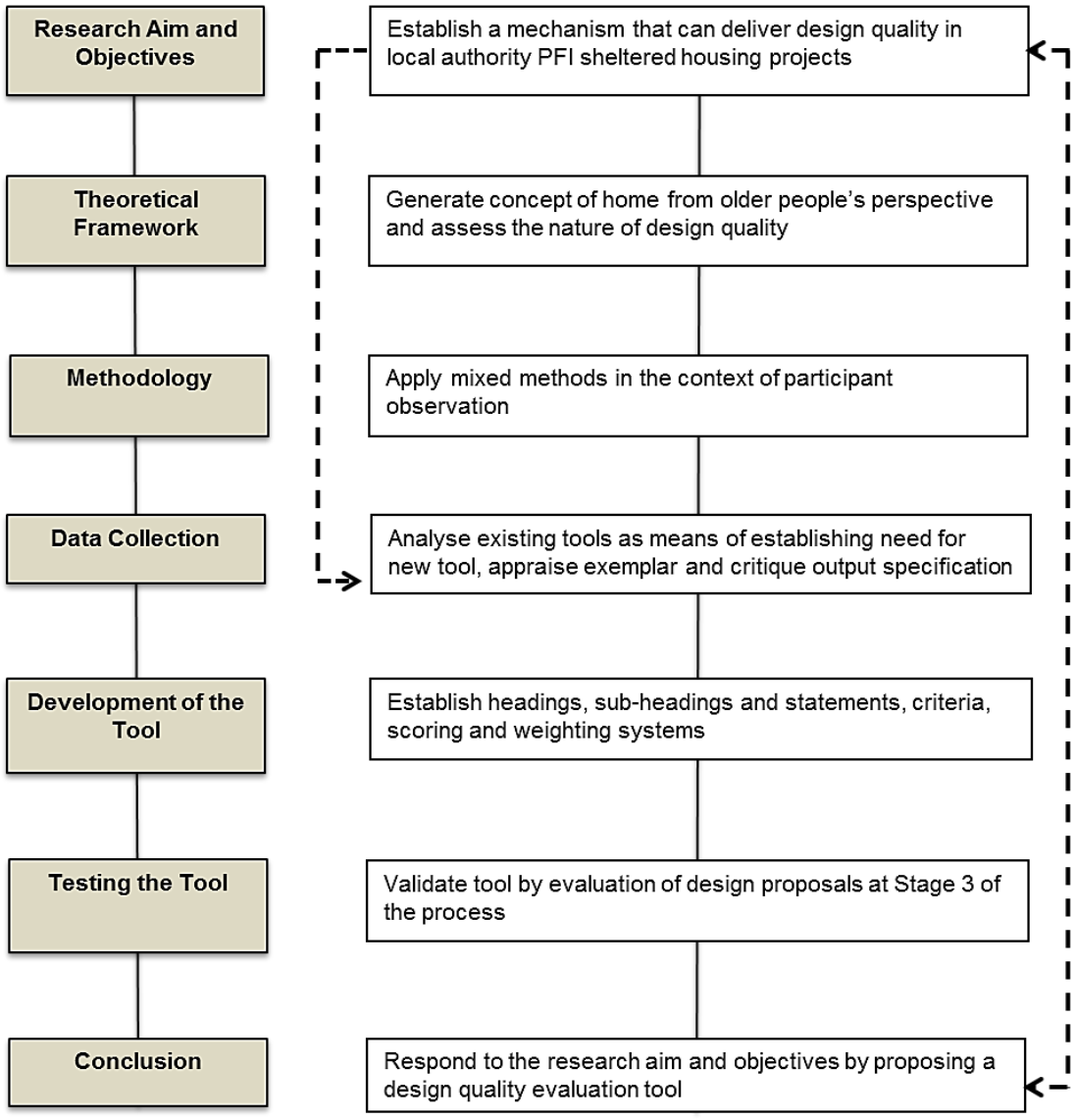

Figure 1.4: Schematic representation of research process

Source: Author

This thesis has five chapters in total, each of the chapters is summarised below:

Chapter 1: Introduction

The first section of this chapter deals with the background to the study, critique of Private Finance Initiative and North Tyneside Council's project to replace its entire sheltered housing stock. The next section discusses the current state of knowledge about architectural design quality in Britain, its assessment and application. The third section states the aim and objectives of the research and the final section discusses the research methodology for the study.

Chapter 2: Theoretical Framework

This chapter explores the Concept of Home and the Quality of Life. It also investigates how these are related to Human Needs, Place, House and Home. Further, the chapter discusses Older People's Perspective, the Physiological and Psychological Needs to accommodate Older People, and Design Quality. This chapter concludes with the Case for Sheltered Housing.

Chapter 3: Background to Building the Tool

This chapter begins with the Analysis of Existing Design Quality Evaluation Tools, followed by a Critique of the Output Specification and Evaluation of an Exemplar Sheltered Housing Project. Thus the need for a new Tool is determined as well as the major issues that should be taken into account.

Chapter 4: Developing the Tool

This chapter establishes the Sub-headings and Statements, Criteria, and Scoring and Weighting. These elements demonstrate how the Tool is constructed and organised.

Chapter 5: The Proposition

This chapter explains the proposal for final Tool and the User Guide. It proposes the Testing of the Tool and demonstrates the Visualisation of the Results. This is followed by Analysis and Discussion on the research findings and the Contribution to Knowledge. Finally, it suggests Further Research that could take place following this study.

Chapter 2: Theoretical Framework

Chapter 2: Theoretical Framework

2.1 The Concept of Home and the Quality of Life

2.1.1 Introduction

Both academics and practitioners have dedicated much effort to debating the concept of home. The literature tends to focus on the physical structure (Despres, 1991a and b), but there is also a social environment (Moore, 2000a) and place (Blunt and Dowling, 2006) in which people live and gain identity (Rapoport, 1995; Moore, 2000b). Home is characterised by experiences, feelings and meanings (Blunt and Dowling, 2006). Research into the concept of home demonstrates that quality of life is based on three components – human needs, place and house (Benjamin and Stea, 1995; Moore, 2000a and b; Mallett, 2004; Blunt and Dowling, 2006). This highlights the need to study these three components in detail.

2.1.2 Human Needs

The seminal works that focus on human needs are essentially those by Maslow (1954) and Max-Neef (1991; 1992); and thus their theories form the basis of this section of the study. Maslow (1954) proposed a needs hierarchy (see Figure 2.1). At the base of the pyramid are physiological aspects. These include shelter, comfort, safety and security. On moving up the pyramid, the picture becomes more complex, as psychological needs are added. These involve belongingness, status, privacy, and beauty at the apex. Maslow (1954) suggests that each lower need must be met before moving up to the next level. However, a criticism could be that the hierarchy appears in the abstract. There is no reference to tangible objects, such as a house, that might engender a physicality through which these notions could be realised. Nevertheless, there is a clear notion that satisfaction increases with rising up the hierarchy.

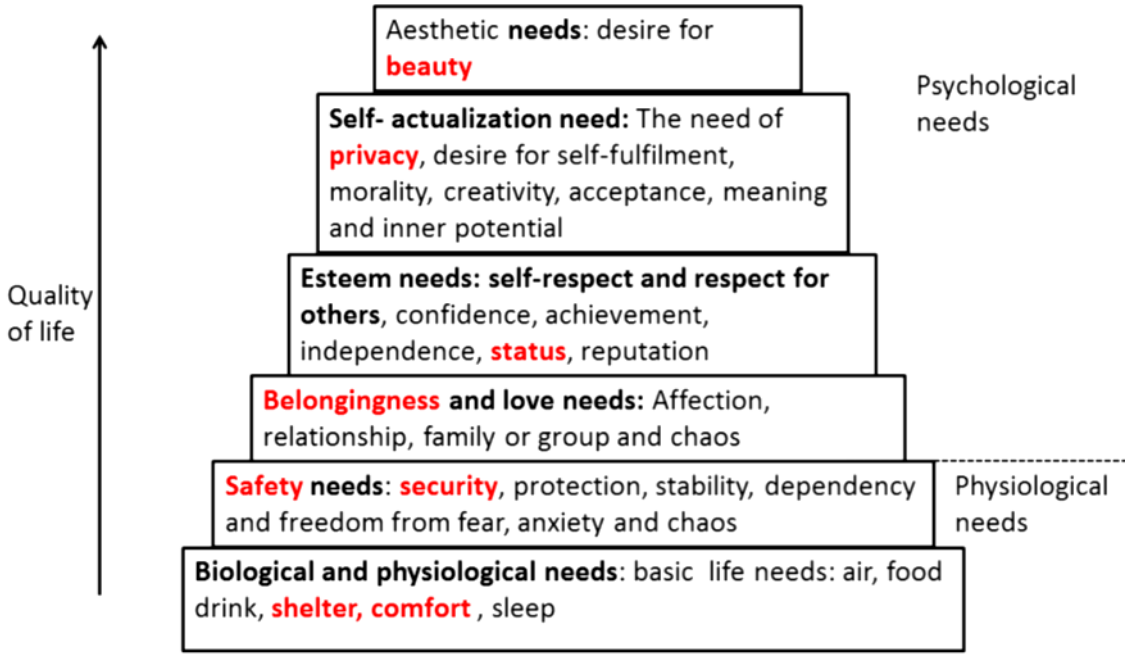

Figure 2.1: Maslow's theory of hierarchy of needs (Maslow, 1954)

Max-Neef (1991; 1992) responds to this intangibility by introducing satisfiers, and categorising them into a matrix (see Table 2.1). He proposed that human needs should be understood as a system in which they are interrelated and interactive. The rows identify nine aspects of human experience, and the four columns suggest how these notions might be enacted. It is clear that although differently expressed, Max-Neef (1992) concurs with the essence of Maslow's (1954) main themes.

Table 2.1: Matrix of needs and satisfiers (Max-Neef, 1992)

Needs according to: existential categories / axiological categories	Being	Having	Doing	Interacting
Subsistence	Physical health, mental health, equilibrium, sense of humour, adaptability	Food, shelter, work	Feed, procreate, rest, work	Living environment, social setting
Protection	Care, adaptability, autonomy, equilibrium, solidarity	Insurance systems, savings, cosial security, health systems, rights, family, work	Co-operate, prevent, plan, take car of, cure, help	Living space, social environment, dwelling
Affection	Self-esteem, solidarity, respect, tolerance, generosity, passion, sense of humour...	Friendship, family, partnership, relationships with nature	Make love, caress, express emotions, share, take care of, cultivate, appreciate	Privacy, intimacy, home, spaces of togetherness
Understanding	Critical conscience receptiveness, curiosity, astonishment, rationality...	Literature, teatchers, method, educational policies, communication policies	Investigate, study, experiment, educate, analyse, meditate	Settings of formative interaction, schools, academies, communities, family...
Participation	Adaptability, recpetiveness, willingess, determination, dedication, respect...	Rights, responsibilities, duties, privileges, work	Become affiliated, co-operate, propose, share, interact, express opinions...	Settings of participative interaction, parties, associations, communities...
Leisure	Curiosity, receptiveness, imagination, recklessnes, sense of humour, sensuality...	Games, spectacles, clubs, parties, peace of mind	Day-dream, brood, dream, remember, give way to fantasies, have fun, play...	Privacy, intimacy, spaces of closeness, free time, surroundings, landscapes
Creation	Passion, determination, intuition, imagination, boldness, rationality, curiosity...	Abilities, skills, method, work	Work, invent, build, design, compose, interpret	Productive settings, workshops, cultural groups, spaces for expression...
Identity	Sense of belonging, concistency, self-esteem, differentiation...	Symbols, language, religions, habits, values, norms, memory, work...	Commit oneself, integrate onself, confront, decide on, recognize oneself...	Social rhytms, everyday settings, maturation stages...
Freedom	Autonomy, self-esteem, determination, passion, boldness, tolerance...	Equal rights	Dissent, choose, be different from, run risks, disobey...	Temporal/spatial plasticity

After considering both the theories by Maslow (1954) and Max-Neef (1991; 1992), a simplified representation of the main issues common to both pioneers is shown in Figure 2.2. This diagram provides a structure for some important issues that might be addressed in the concept of home, and are related to an increasing quality of life. According to Maslow's (1954) human development theory, quality of life is identified as a hierarchy of need satisfaction for the members of a community. The greater the satisfaction of needs extends up the hierarchy, the greater will be the quality of life in that community. In terms of the provision of places to live, a developed society

should be seeking to satisfy belongingness, status, self-esteem, privacy and beauty.

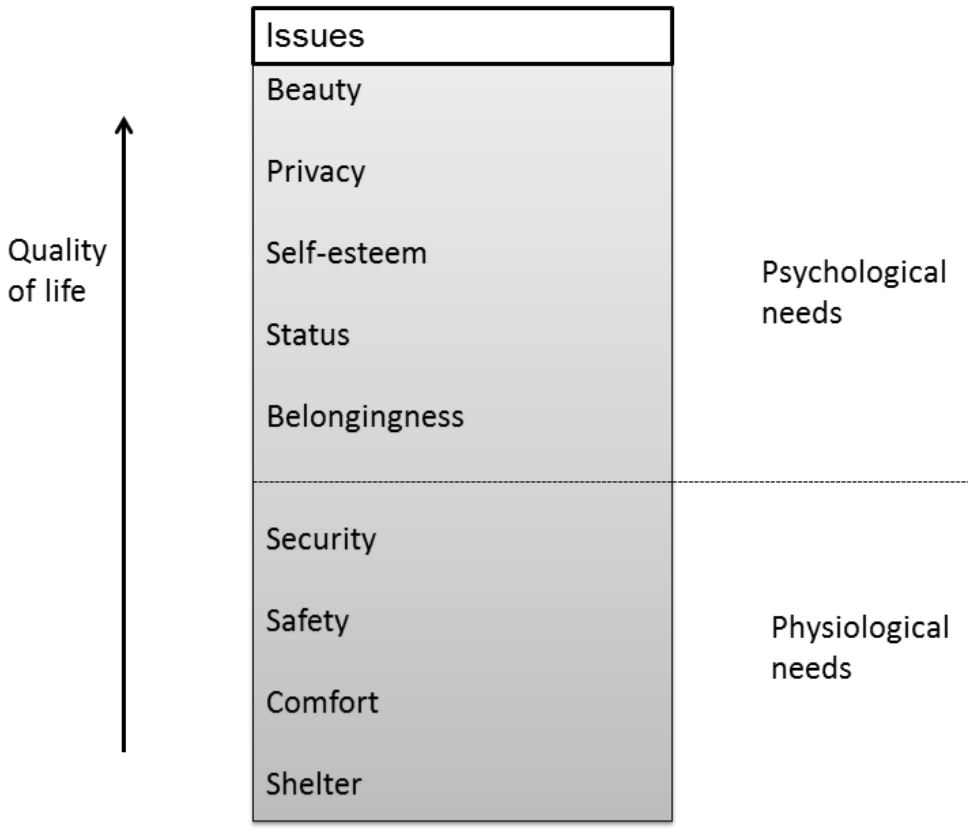

Figure 2.2: Simplified diagram for hierarchy of human needs
Source: Author

Moreover, all these facets should not be considered as isolated events. For example, Altman (1975) discusses the interrelationship between privacy and belongingness. These qualities may be perceived as mutually exclusive. However, human beings are complex creatures and crave one or the other at different times. The point is that both options should be available. Nezlek et al. (1994; 2002) observe that the apparent contradiction of this polarised situation seems to increase as people become older. Altman (1975; 1976) introduces an interesting concept of individuals using privacy as a means of maintaining control over being overwhelmed by numbers of people. In this proposition, he points out that crowding, rather than intensifying social interaction actually creates social isolation and privacy is used as an escape mechanism. So, essentially, it is vital to understand the difference between privacy and isolation, interaction and crowding. Dupuis and Thorns (1998)

and Phillips (1992) recognise the relationship between interaction and security, especially in the case of elderly people. The desire for continued independence is a strong stimulus as people become older. Yet, there are associated risks and the provision of security devices and procedures is viewed as both a safeguard and a threat. This highlights the need to achieve full consideration of security and surveillance versus freedom and openness; as well as privacy and refuge versus social interaction.

It is clear that the concept of satisfaction of human needs is fundamental to attaining quality of life. This is expressed in a hierarchical structure, i.e. from basic biological maintenance up to self-fulfilment and psychological enhancement. It is evident that individuals seek to satisfy needs for two main reasons: to accomplish higher levels of personal contentment and to achieve social recognition, in order to achieve their full potential (Maslow, 1954). This section of the study has identified a simplified hierarchy of human needs that could be related to the concept of home and to quality of life. It shows that while physical needs must be met, the real challenge is in satisfying the higher order attributes. In addition, these aspects are not experienced in isolation, and their interaction is apparent. The literature also demonstrates that the ambition to satisfy these needs intensifies as people age (Torrington, 1996; Barnes, 2006). As belongingness, status, self-esteem, privacy and beauty are high level objectives, it is important to understand how these concepts are related to the place where people live.

2.1.3 **Place**

To explore the significance of place in people's lives, a variety of influences have been examined by philosophers, geographers, psychologists, architects, poets, amongst others (Casey, 1997; Altman and Low, 1992; Norberg-Schulz, 1979; Tuan, 1977). The perspectives of place are dominated by the following interconnected components: the physical setting, people and the activities enacted in that place (Canter, 1977a; Relph, 1976; Stedman, 2002; Stedman 2003). The notion is of capturing people's relationships with the physical environment and should be understood from the perspective of the people who have given it meaning (Canter, 1977a;

Norberg-Schulz, 1979). The literature recognises that three related concepts, in particular, have the most explanatory power for capturing both people's essential experience of, and emotional engagement with, place. These are: attachment (Altman and Low, 1992), identity (Proshansky, 1978; Proshansky et al., 1983) and sense of place (Gesler, 1991; Hay, 1998a and b). A number of authors have also acknowledged the importance of place in human lives (Hay, 1998a; Tuan, 1977; Rappaport, 1995). Most researchers agree that place and its meanings are created in a complex manner and involve a variety of interconnected variables (Relph, 1976; Tuan, 1977; Norberg-Schulz, 1979; Casey, 1997; Altman and Low, 1992).

The recognition of place requires a dynamic perspective – one that emphases people's ongoing, evolving relationships, i.e. recognising that it is a continuing process. Sense of place is a primary measure of human relationship with a spatial location and thereby it is given special meaning (Gesler, 1991; Hay, 1998b). In psychological research, it has generally been used to describe people's overall association with place and it guides their behaviour (Buttimer, 1980; Tuan, 1980; Altman and Low, 1992). It is related to feelings and perceptions that people have through experiencing place (Tuan, 1977; Williams et al., 1995). Norberg-Schulz's work (1971; 1979) on genius loci, meaning the spirit of place, explains that it is a way to express the emotional significance which is attached to it. This is also explained through the work on sense of place versus placelessness and differences between levels of insideness and outsideness (Relph, 1976). Outsideness is expressed as a feeling of separation between a person and place, whereas insideness is defined as a sensation that emphasises the connection with place.

People impart meaning to place through a number of ways and for a number of reasons, and generally more than one attribute contribute to these meanings. People demonstrate sense of place by applying their moral and aesthetic judgement to sites and locations. Place can express people's experiences and aspirations, and becomes meaningful due to the interaction of various attributes, such as activities, traditions, social ties, or length of association (Hummon, 1992; Low, 1992). Therefore without a thorough

understanding of a location, it would be difficult to describe why a particular place is special (Relph, 1981; 1993). Sense of place is mostly experienced through symbolic significance, which requires close contact and often long association with the particular environment. The prolonged association evokes affection and is not necessarily visually obvious. This occurrence is demonstrated through the concepts of place attachment (Altman and Low, 1992) and place identity (Proshansky, 1978; Proshansky et al., 1983). These concepts are also explained in Tuan's (1974; 1977) work on positive effective ties to place, which he calls topophilia. It is an effective response to place, but is also a practice that can actively produce environmental quality for people to enjoy (Duncan and Duncan, 2001).

The understanding of place is a lived engagement process that grows attachment to an extent that people feel that they belong and gain identity from being part of that environment (Giuliani and Feldman, 1993; Altman and Low, 1992; Moore, 2000a and b). Place attachment is a positive bond to physical and social settings that support identity and offer other psychological benefits (Moore and Graefe, 1994). It is encouraged by daily encounters with the environment and neighbours, seasonal celebrations, sustained physical personalisation, and warm feelings about the neighbourhood (Brown and Werner, 1985; Werner, Altman, Brown, and Ginat, 1993). Several authors note that place attachment grows with time (Altman and Low, 1992).

The Theory of Place Identity (Proshansky, 1978; Proshansky et al., 1983; Giuliani and Feldman, 1993) is defined as a more emotional constituent that is also formed and reinforced over time. It has been defined as dimensions of the self that develop in relation to the physical environment (Proshansky, 1978). It is referred to as ties between people and their surroundings (Proshansky et al., 1983), in which people develop as they increase their sense of belonging to a community (Relph, 1976). Thus, place is a site of interaction and identity. It has the potential for shaping and being shaped. It is also clear that people and place have strong connections and achieving these connections is necessary for generating meaningful domestic environments.

Different meanings of place recognised by several authors are documented in Table 2.2.

Table 2.2: Different meanings of place

Authors	Meaning of place
Norberg-Schulz, 1971	Centres of value and significance.
Tuan, 1974; 1977	Positive affective ties (i.e. concept of topophilia).
Relph, 1976	Belonging to a community.
Casey, 1977	Identity, character.
Buttimer, 1980	Maintenance of personal identity and emotional well-being.
Buttimer 1980; Seamon, 1980	Relationship with the neighbourhood.
Seamon, 1980	Bounded, unique, identity, having genius loci, being historically rooted.
Proshansky et al., 1983	Personal development, component of the self-identity.
Agnew and Duncan, 1989	Attachment.
Feldman, 1990	Community identity.
Gesler, 1991	Ethical and aesthetic judgements.
Altman and Low, 1992	Self-identity.
Brown and Werner, 1985; Werner, Altman, Brown and Ginat, 1993	Daily encounters with the environment and neighbours, physical personalisation, and effective feelings towards and beliefs about the home and neighbourhood.
Hay,1998	Rootedness and community interaction.
Moore, 2000a & b	Meaningful relationships with the places and ultimately incorporating them as part of their self-identity.

The definitions in the table show that place is about the nature of different connections with people, and the processes through which place is given meaning by people. People can transform amorphous space into recognisable place (Tuan, 1977). It is accepted that meaning becomes even stronger through exploring people's emotional relationships, how they form these experiences, and express affective bonds with their surroundings (Giuliani and Feldman, 1993). All geographical space has the potential to become quality place through long-lasting emotional involvement in, and with it. This concept is important as it forms the parameters for achieving quality of life and attachment to a particular setting is influenced by the qualities and characteristics of that place. Table 2.3 shows the essential concepts of place, distilled from the different meanings in Table 2.2.

Table 2.3: Concepts of place

Place
aesthetic judgement
character
well-being
attachment
identity
value and significance
community interaction

A central reason for this study is to understand the concepts clearly, as they can contribute to the creation of quality domestic environments, i.e. designs that not only make use of spaces, but also enhance human experience. The literature highlights that the positive meanings people attach to place, contribute to their sustaining health and well-being. The literature also points to ways that the concept of place might be strengthened, and place attachment and identity intensified. Place identity plays fundamental roles in human life and it is integral to place making, which in turn enhances the identities of people who use the place. The desire for identity deepens as people age (Baumeister and Leary, 1995). It is also noted that the notion of dwelling could be defined as a place to which one is attached, feels comfortable and secure, and experiences enjoyment (Moore, 2000a and b; Oswald and Wahl, 2005).

2.1.4 **House**

Researchers have identified the non-emotionally-based aspect of house (Relph, 1976; Tuan, 1980; Horwitz and Tognoli, 1982; Dovey, 1985; Casey, 1993; Moore, 2000a). A house can usually be characterised as a physical unit, with distinct spaces for its residents providing shelter and protection, and a structure separating private from public domains (Lawrence, 1987a and b; Rapoport, 1995). It is an artefact (Rapoport, 1969; 1985) that may also provide investment returns and other financial benefits through ownership. Therefore, as Le Corbusier (1923) points out, a house can be interpreted as merely a machine for living in, as it lacks psychological significance for individuals (Dovey, 1985).

A house is essentially provision for activities, where each space may have a specific function, e.g. living, sleeping, cooking, bathing, entertaining and storing (Rapoport, 1990b). The spaces could be cellular, where each activity is allocated a separate space, or open plan, where a number of different activities occur in a single space (Hanson, 1998). This organisation of spaces within a house is fundamentally about responding to relationships between users, in which their interactions may be formal or informal, intimate or distant, private or public in nature. Moreover, the permeability or accessibility of spaces is a variable that has been investigated to consider the public versus private character of these spaces. The arrangement of spaces determines the formal compositions of the building. Yet, a house is more than simply space. It has a physical form that can be characterised by features such as length, width, scale, geometry, texture, colour and light. It is constructed from building materials, which might be described as warm, cold, creative or bland (Rapoport, 1969). A building constructed of natural materials, e.g. brick, wood and stone evoke completely different feelings to man-made materials such as concrete, steel, glass and metals. It is also recognised that different architectural types, e.g. detached, semi-detached, and terraced; create different spatial patterns in a neighbourhood. An apartment can evoke alternative sensations to a house of a similar size. A house may have a garden, and therefore a relationship between inside and outside could exist that might not be a feature of an apartment (Cooper, 1974).

The access to a house is a clear threshold, i.e. the entrance or access from the street, which serves to define territory. This threshold varies in different cultures and periods. In some houses, users may enter through a hierarchy of spaces. Front and back help to differentiate formal and informal visiting patterns. The entrances could be used for separate functions or categories of people (Rapoport, 1969). Nevertheless, the notion of threshold fundamentally changes character where apartments are concerned. Its location within a building reduces the clarity of territorial boundaries. The notion of entrance is less distinct than where moving from outside to inside.

House is fundamentally about performance attributes, e.g. fitness for purpose, building utilisation, temperature/ventilation, illuminance/sound, energy utilisation, and buildability, which affect the operational efficiency of the building (Giddings and Holness, 1996). Although fulfilment of these performance attributes is essential, they are lower orders of design aspiration. House also provides its users with space for their belongings (Hillier and Hanson, 1984).

The study of house is significant, as it helps in understanding that physical characteristics are important in that they afford different options for people and therefore different impacts on the quality of life. The variety of houses presents a complex picture in which there may be a desire to be what is perceived as upwardly mobile. In this scenario, the trend could be from apartment to terraced house to semi-detached house to detached house. Alternatively, it could be from a house with no recognisable style to one with a distinctive style, often historical. Yet again, the end goal could be a chic city apartment or a cottage in the country. Aspirations are as multi-faceted as the number of people, and there is no standard profile for what people want in a house. However, each individual has a life cycle, and it is the response to this life cycle that influences demand for particular house types. Aspirations generate what is perceived as upward movement. Yet, as in Shakespeare's seven ages of man, around the sixth age what is commonly called downsizing may take place. It is the nature of this downsizing that requires particular care.

People may need to make this big decision as they age i.e. whether to stay in their family home or consider a move to smaller house that better suit their care needs. As suggested by Hughes (2012) older people have strong ties to their family homes. They usually prefer to cope rather than to move, even when they really struggle to get up stairs or to heat the entire house (Croucher, 2008). This is predominantly due to the emotional and sentimental attachment to the place, the neighbourhood and local community. Sometimes, it is the fear of the unknown and concern about transaction costs, removals costs, and possible poor choice of a suitable and affordable house to move to. All these reasons can make the prospect of

moving into a new house tremendously difficult for older people. Alternatively, the decision to downsize may be driven by the realisation that the family home is too big to manage and is uneconomical. Sometimes it is a sudden decision due to loss of income or health problems. Previous research has highlighted that this kind of move is particularly stressful for the older people, and some never recover from it. Nevertheless, research also shows that many older people are satisfied with their decision and their new home once they have settled-in (Hughes, 2012). Ultimately, older people consider moving as they desire a house that will cater for their current situation and meet their future needs. They essentially require accommodation that is of good quality, energy efficient, safe and enhances social interaction; a place where they could live independently and be part of the community (Rahman, 2014). It is often a matter of courage and timing.

Those who feel that they are able to move often choose low-density housing neighbourhoods in suburbia to meet their requirements for safe streets and good public services (Rapoport, 1985). The debate that ensues about how much protection is needed to ensure safety and how much support is required. In all the ages of man, people seek out their own age group and social class for reassurance. This need seems to strengthen with age and close homogenous communities are sought. These communities may be found within a single building, rather than within a neighbourhood. Table 2.4 identifies the essential elements of a house.

Table 2.4: Elements of a house

House
space
threshold
materials
types
form

The next step is to explore how house, which is nothing more than a physical structure, can become home, which is a place where high level human needs are satisfied.

2.1.5 **Home**

This section examines the concept of home and the ideas, interpretations and meanings associated with it. Home represents practical and psychological components of the way people live, or would like to live. Many scholars have long contributed to debates about what constitutes home and what constitutes the qualities of home (e.g. Cooper, 1974; Hayward, 1975; Porteous, 1976; Appleyard, 1979). Studies in environmental psychology have established that home has discrete social, personal, physical and cultural qualities, although these qualities can be integrated to such an extent that they are difficult to unpick (Despres, 1991a and b; Sixsmith, 1986).

It is clear that in order to design a home environment, combinations of the three components – satisfaction of human needs, place and house are required. Figure 2.3 illustrates a balanced relationship between these components.

Figure 2.3: Balanced relationship between the components
Source: Author

Research into the components has shown that contrary to some of the literature (Steward, 2000), house is not synonymous with home, although

these terms are still used interchangeably. It may be that, historically, the house component implied more significance because of the confusion between the house and home. Alternatively, it might have been because the parameters of a house as a physical building are just more easily measurable; whereas the feelings of particular moments and experiences generated from the use of home are vital and encourage the human spirit, but are less readily categorised (Chapman and Hockey, 1999).

Home in this sense does not mean simply to build a house, but to dwell in and create a complete environment to which its residents are attached. Home is defined by the way people make their world meaningful (Heidegger, 1962; 1971). Home provides the primary anchor for an individual (Rapoport, 1990b) as well as the primary functions of security, safety, comfort and shelter. Home has symbolic and latent meanings that are internalised by its residents (Rapoport, 1995). It offers psychological reassurance as well as satisfying physiological needs. These are specific to individuals and are essentially intangible concepts.

Seminal writings on the meaning of the notion of home (e.g. by Hayward, 1975; Despres, 1991a and b; Dovey, 1985) provide knowledge regarding the human-environment relationship. Alexander et al. (1977a and b) emphasises that domestic built environments connect individuals to their surroundings in an infinite number of ways, most of which are subconscious. For this reason, it is significant to determine what works, what feels pleasant, what is psychologically beneficial, and what appeals. Thus, home should incorporate a wide variety of personal values, such as aspiration, motivation, physical well-being and lifestyle choices (Hayward, 1975; Feldman, 1990). A taxonomy of meanings (see Table 2.5) provides a more comprehensive profile of the notion of home from a number of identified categories. The meanings include relationships with family and friends, refuge from the outside world, security and control, personalising the house, permanence and continuity, indicator of personal status, and a reflection of one's ideas and values (Hayward, 1975; Dovey, 1985; Despres, 1991a and b; Rapoport, 1995).

Table 2.5: Taxonomy of meanings

Identified categories	No.	Authors	Different meanings of home
Identity	1	Cooper, 1974	Symbol of self
	2	Hayward, 1975	Home is a primary territory (personal control/ privacy), self-identity, social and cultural significance
	3	Altman, 1975;1976	Privacy, emphasising the aspect of control
	4	Porteous, 1976	Personalisation; form of presentation of self
	5	Relph, 1976	Self-identity and human existence
	6	Seamon,1979	Warmth, care and cosiness experienced in the atmosphere at home
	7	Sixsmith, 1986	Emotional environment; ownership and symbolises family life and happiness; symbol of self; quality of social relationships; privacy, security and freedom at home permit a significant range of self- expression
	8	Douglas, 1991	Bringing spaces under control
Identity (continued)	9	Despres, 1991a & b	Social relationships, refuge, security, sense of belonging and self-identify
Privacy/Freedom over space/Safety and security	10	Appleyard, 1979	Comfort and satisfaction Provide social as well as psychological needs
	11	Dovey, 1985	Security, independence, privacy, comfort, identity, status, and connectedness
	12	Lawton, 1985	Control over space
	13	Tognoli, 1987	Feeling of privacy and refuge but allows a range of social relationships
	14	Saunders and Williams, 1988	Privacy at home refers to freedom from surveillance
	15	Giuliani, 1991	Mere presence, vicinity or accessibility of the object
	16	Smith, 1994	Personal freedom and privacy
	17	Rapoport, 1995	Entity that separates private from public domains
	18	Dupuis and Thorns ,1998	Where ontological security is maintained
	19	Moore, 2000	Privacy, comfort, security and refuge
Social relationships	20	Norberg-Schulz, 1965	Territorial function, a social and cultural function and a protective function
	21	Rowles, 1983	Personal experience and familiarity
	22	Lawrence, 1987a & b	Focus for a range of social networks along with protection to the inhabitants
	23	Werner et al., 1992	Privacy, as the setting for the enhancement and support of a range of interpersonal relationships
	24	Somerville, 1997	Home is a multidimensional concept: shelter; hearth; heart; privacy; roots; abode and paradise (the ideal)

All the authors included in the table have in common that they acknowledge home as a complex, multi-faceted and multi-layered concept, where different

connotations can occur interchangeably and/or simultaneously. Home is not merely a place to live, it is a way of weaving life into particular geographic space; and in this way, it is observed as a holistic entity comprising three interrelated qualities of people, environment and time.

Home transcends the material characteristics of domestic space. It is not neutral space but fulfils a role as the setting for social relationships. It gives its inhabitants comfortable spaces, but also spaces where they can bring a sense of order to their lives. Home is identified as place, in which people can be more themselves than in any other space (Cooper, 1974; Hayward, 1975; Dovey, 1985; Despres, 1991a and b). Furthermore, the residents give a sense of identity to the place they call home and they draw their identity from it. Finally, home also has to be a physical entity, i.e. a house where people undertake their daily activities.

This study recognises home as a place of absolute freedom, with ontological security that provides an interplay on a variety of levels of experience from personal to cultural. It is also clear that an appropriately designed domestic environment has many benefits for its dwellers, improving their quality of life and maximising physical and mental health. One of the most important considerations is how the relationship between people and their homes, develops throughout their lives – especially as they begin to age.

2.2 Older People's Perspective

This part of the study examines what it is about a place that older people experience as home. As people grow older they may develop physical impairments, e.g. mobility, sensory functions, motor control and manipulation loss; cognitive impairments; impaired abilities to understand their environment, carry out activities, communicate, or remember what they have done or even where they are (Barnes et al., 2001; Barnes, 2002). The essential need for the older population to lead a life of quality is to overcome these barriers that are linked with the ageing process. It has been identified from past research that in homes with design features that offer the most compensation for physical and sensory frailties, the residents exhibit the greatest control over their immediate environment, and where there is

greater compensation for cognitive incapability, residents feel more positive and confident (Lawton, 1982; Barnes, 2002).

It is anticipated that quality of life is the degree to which the human needs are satisfied. If Maslow's (1954) hierarchy is taken as the starting point, it will be recalled that at the base of the pyramid are the physiological aspects. These include shelter, comfort, safety and security. On moving up the pyramid, the picture becomes more complex, as psychological needs are added. These involve belongingness, self-esteem, privacy, and beauty at the apex. The identified issues are important for home and are especially important to older people. Actually, all these issues become more intense with age, as it is typical for the elderly to experience a decline in strength and stamina, mobility and sensory functions (Torrington et al., 2004; Burton and Torrington, 2007). People think that they can find comfort, safety and security in their own homes but, as they become older, the reality changes; e.g. their existing houses become too big to be maintained by them. Within this context, what they need and what they want are perhaps quite different. This creates a dilemma that has to be resolved.

A key concern surrounding housing for an ageing population is the ability of people to look after themselves, i.e. functional capability. This refers to the capacity for any individual to live safely, independently and easily, regardless of physical limitation (Barnes et al., 2001). Often the greatest fear in the ageing process is a fear of losing one's independence, a need to continue to be actively involved in life (Barnes, 2006). Retaining mobility and independence is vital because it enables older people to venture outdoors, to enjoy life, to meet other people without being dependent on others. This is absolutely right but at the other end of the scale, how safe and capable are older people in living independently? The desire for continued independence is a strong stimulus as people become older. Yet, there are associated risks, and therefore the provision of safety devices and procedures may be viewed by them as both a safeguard and a threat. Dupuis and Thorns (1998) recognise the relationship between sense of security and control. They point out that it is clearly important to design safe environments, but the challenge is to do it without compromising individual freedom. Thus a careful balance is

to be met between independence and where older people can comfortably use and enjoy the environment without worrying about falling, tripping or being attacked.

As elderly individuals search for meaning in their lives, there comes recognition and acceptance of the importance of a sense of community. The importance of belonging, i.e. either within the family or within the wider community is a vital component to meaning in their lives (see Figure 2.1) (Oswald, 2003). Human ecology theory also states that interaction between people is so significant that lack of social integration can potentially decrease the individual's capacity for dealing with stress, and lead to increasingly poor health. People have a strong need for interaction and this aspect has to be brought into the life of older people (Baumeister and Leary, 1995; Nezlek et al., 2002; Lawton, 2001). However even this interaction caries danger, as elderly people can be fearful of meeting new people (Bowling, 1995).

Lack of mobility restricts older people's ability to go outside which can lead to loss of their social activities, such as relationships with family (see Figure 2.4) and friends (see Figure 2.5).

Figure 2.4: Relationships with family
Source: Alexander et al., 1977a

Figure 2.5: Relationships with friends
Source: Giddings, B. (2008) People and Places [Presentation for the Bidders]. 8 December.

Despite concerns, the experience of growing old can be associated with a positive outlook on life and also an active approach to handling the challenges of ageing. The elderly wish to be useful and want to continue to contribute to the community so that they can maintain a sense of continuity within their lives. Active involvement in daily life gives a feeling of being valued and it also means that, despite being old, people are still capable of carrying out tasks. This provides encouragement, a feeling that life still is worthwhile and gives them strength that helps to preserve self-esteem and meaning to their existence (see Figure 2.6).

Figure 2.6: Activities
Source: Giddings, B. (2008) People and Places [Presentation for the Bidders]. 8 December.

It has been suggested that, with ageing, the need for physical security and emotional security are intensified. For many older adults, home becomes more important, central to daily living and the base for activities (Sixsmith, 1990; Moore, 2000a and b; Oswald and Wahl, 2005). Thus the domestic setting should be an especially safe and secure environment that enables residents to move about freely and keep their possessions intact as they can be fundamental to maintaining a clear sense of being.

Becoming older may mean a change in the domains of importance in the perception of the quality of life. Social interaction can provide older people with a meaningful role that gives them a sense of value, purpose, identity, and attachment to a community. As the domestic environment acquires new meaning in old age, its design should compensate for the diminished functional capacity (Torrington, 1996; Torrington et al., 2004). Consequently it is essential that design solutions offer choice between private and social contexts, retreat opportunities, and stimulating social features. Accessing outdoors may further encourage interaction with others and generally to take part in the social life of the wider community. However, the elderly also wish to keep their interactions under control, so that an acceptable level of privacy is achieved (Altman, 1975; Leino-Kilpi et al., 2001). An appropriate balance should be achieved between social interaction, privacy and refuge; as social isolation, is a significant threat to older people. Altman's (1976) notions of privacy and belongingness, and the observations by Nezlek et al. (2002) that the apparent contradiction in this polarised situation seems to increase with age, are points made in the analysis of human needs. The debate is whether the existing family house can continue to satisfy this complex set of circumstances as its residents become older.

Attention to sensory stimulation is a significant aspect of friendly environments for older people, as it has positive benefits. The literature suggests that outdoor environments, in particular, have numerous attributes (Day et al., 2000; Curtis et al., 2007). Apart from providing physiological benefits, like the enhancement of physical health; they also have psychological benefits that include stress reduction, contentment with life, and sense of happiness (Nezlek et al., 2002). Outdoor activities such as

walking and especially gardening can enhance older people's sense of achievement, confidence, and satisfaction (Chalfont, 2005). Exposure to natural daylight is another health benefit that is gained from having access to the outdoors. Figure 2.7 shows the transposition of a room to an external environment, where relaxation can be achieved outdoors.

Figure 2.7: Outdoor room
Source: Jones, P. and Sharma, M. (2008) Architecture and Spatial Design [Presentation for the Bidders]. 8 December.

2.3 Accommodating Older People

In order to maximise the quality of life for older people, it is important to assess the nature of accommodation that would best fit their needs.

2.3.1 **Physiological Needs**

Shelter

Older people are often restricted in and around the house due to their physical impairments. Both houses and apartments provide functional spaces, i.e. the physical environment for older people to perform their everyday domestic activities. However with the decrease in activity, spaces can become difficult to use and maintain. Residents sometimes have to change their use of space for convenience, e.g. store rarely needed items in

higher cupboards and frequently essential items in accessible cabinets; or keep regularly used items within easy reach by leaving them out on surfaces. This reduces the usefulness of the surfaces and can induce hazardous situations. Houses can allow for adapted uses, e.g. a spare bedroom could double as a dressing room, so that residents do not have to worry about access to a confined wardrobe. However, this might be difficult in an apartment where space is limited. Houses may have to be adapted, or furniture positioned to increase circulation space for people experiencing difficulty in moving around their houses with walking frames or wheelchairs. As well as insufficient circulation space, the doorways may be too narrow for wheelchair users. Due to physical disabilities in old age, some people find it difficult to use their existing bath and instead require a shower, although a shower may increase the risk of falling. There can also be an impact on the general upkeep of the garden spaces which can become lost spaces with the passage of time. Older people may be worried about their ability to deal with repairs and how to seek required home adaptations. However, these adaptations are significant in helping older people to cope with their physical limitations.

An apartment may be considered as alternative accommodation, but as well as a notion of small spaces (Alexander, 2002), there is a perception that apartments are set in anonymous blocks, which lose all association with the concept of home (Sixsmith et al., 2007). There are also issues about the maintenance of common spaces, which can become unpleasant and even result in health and safety problems.

Comfort

Disability in old age can limit mobility to the point where a person is unable to use the stairs in a house and is therefore confined to downstairs rooms. To maintain sufficient temperature may require heating the whole house, which could be expensive. Houses generally cost more to operate as they have higher resource consumption compared to apartments. In addition to the need for ensuring that heating systems are efficient and reliable, conversely there is a need to ensure that vulnerable elderly people are able to stay cool

in hot weather. Therefore, it is important to provide an environment with appropriate temperature and ventilation, so that the building temperature remains at about 21°C during the day, and 16°C at night, even in extreme heat and cold (Shorrock and Anderson, 1995). Background noise can affect the hearing ability of older people, and make them feel confused and disoriented (Day et al., 2000). Therefore, settings that accommodate older people should control noise transmission. Both houses and apartments can fail to withstand the unwanted noise. Particularly in the case of apartments, noisy neighbours may be found on all sides. Ideally, buffer zones should be provided between service areas and apartments, and adjacencies of bathrooms and kitchens between apartments minimise disturbance. However, these provisions are often not achieved, as in Figure 2.8 below.

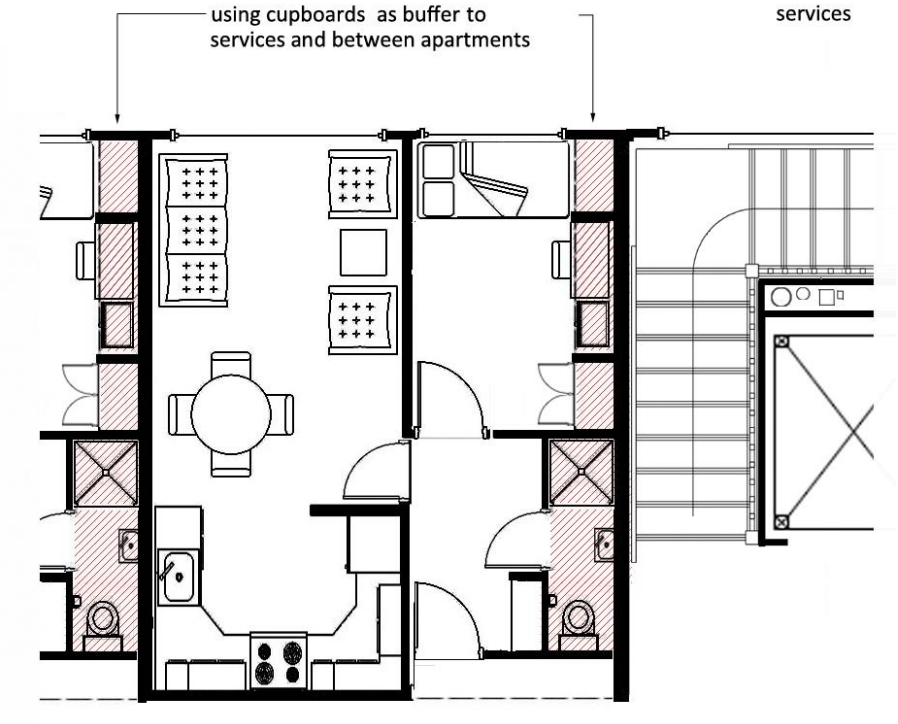

Figure 2.8: Apartment layout showing buffer zones
Source: Author

Due to diminished visual ability, older people require a greater intensity of light. Houses have more capacity for natural light, as apartments are generally double-banked, only allowing windows on one side. Yet there is great advantage in designs that allow windows in more than one wall (see Figure 2.9).

Figure 2.9: Apartment with natural light in two walls
Source:
https://www.google.co.uk/search?q=Apartment+with+natural+light+in+two+walls&biw=1920&bih=934&source=lnms&tbm=isch&sa=X&ei=MQEgVLnjCoTYOdbogZgG&ved=0CAYQ_AUoAQ

Spaces accommodating older people should also avoid glare, such as a brightly lit window at the end of a dark corridor. Windows along the circulation routes would not only help in providing a more even light distribution but would also offer views and connections with the outside to aid orientation and finding one's way. Consideration should be given to providing access to external space from individual apartments including patios, balconies and terrace areas. The difficulty is that most of these issues are usually overlooked due to the economics of development, and the speculative nature of the housebuilding sector that does not cater for any specific user group.

Safety

Due to physical and cognitive impairments, many activities undertaken by older people could present potential dangers. Threats such as falling, illness and isolation could adversely affect their independent living and quality of life (Torrington, 1996). Therefore the layout and materials used for

accommodating older people should reflect safety requirements. For example, apartments should be arranged as small scale, legible and non-institutional environments. Similarly, the site layout should encourage safe, logical and unobstructed relationships from entering the site boundary to the main entrance to the building. The entrance should be well defined in its positioning and treatment (Alexander et al., 1977a). Designs should also encourage natural surveillance of external spaces and blank walls should be avoided to maximise safety and reduce the opportunity of criminal activity (Association of Chief Police Officers Crime Prevention Initiatives, 2004; Colquhoun, 2004). Particular attention should be afforded to the common areas.

Changes in level, both externally and internally, should be avoided. If they are unavoidable, they should be clearly identified, illuminated and designed to assist accessibility for all, and the materials used should be suitable for older people. Matt finishes are preferred to glossy reflective ones (Older Persons Housing Design European Good Practice Guide, 2007). Ramps are preferable to steps but the required gradient can mean that a ramp occupies considerable space (see Figure 2.10).

Figure 2.10: Space required for ramp

Source: http://www.cmhc-schl.gc.ca/en/co/acho/acho_007.cfm

To further enhance the safety of individual users, the design of houses and apartments should allow for visitor recognition, by incorporating vision panels at entrances (Weenig and Staats, 2010). Private gardens, particularly with apartments, can provide a connection between the accommodation and outside space that minimises the change in material and avoids steps (see Figure 2.11) (Alexander et al., 1977a and b; Day et al., 2000). While safety is essential, management of risk and loss of control that people have over their own lives, is a major challenge – one in which the design of safe environments should not compromise individual freedom (Burton and Torrington, 2007).

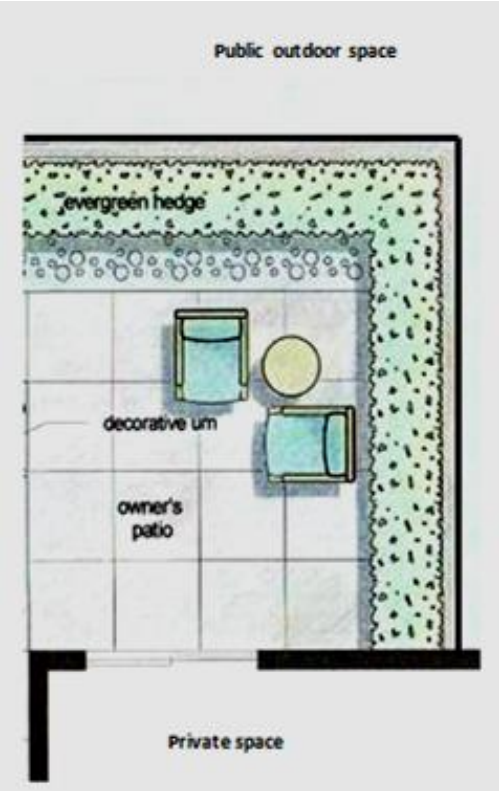

Figure 2.11: Access to safe external space
Source: Author

Security

The boundary materials of and treatments to a property should be appropriate, attractive, durable and unobtrusive, and be maintained in that state. However, maintenance of outdoor spaces becomes more difficult with increasing disability and decreasing revenue. The boundary should provide

meaningful enclosure without cutting off views, and should promote good natural surveillance with a secure, pleasant approach to the building entrance. Suitable methods of security could be incorporated into the entrance for both houses and apartments, as they would help to prevent entry by uninvited non-residents. Nevertheless, older people may struggle with any new technology.

2.3.2 **Psychological Needs**

Belongingness

Existing research has identified that community integration is associated with decreased feelings of loneliness and depression (Mullins and Dugan, 1990; Nezlek et al., 2002) and with increased satisfaction and well-being (Fox and Gooding, 1998). People who have active social lives tend to report feeling better about themselves and their lives (Graney, 1975). Therefore, houses and apartments should encourage social interaction. To accommodate older people, it is recognised that pedestrian-based neighbourhoods offer additional opportunities to meet neighbours and engage in social activities as compared to those living in more car-based environments (Leyden, 2003). These social ties with neighbours could enhance the quality of life of older people and have a positive effect on their well-being (Bowling et al., 2003). Yet, there is the difficulty that older people often cannot walk far, and need places to rest. Research evidence also suggests that casual social encounters are at least as important as formal social activities in terms of promoting a sense of community (Alexander et al., 1977a; Hertzberger, 1998). For these reasons, groups of apartments that provide interesting, flexible casual sitting and gathering spaces within the horizontal circulation to allow users to utilise the space for socialising and rest are much appreciated. However, there are always issues about the cost of circulation spaces of this kind and who would maintain them. It is seen that such provision is lacking in the majority of multiple-occupation accommodation, as generally developers do not recognise their value and active residents do not feel the need for such spaces.

As recommended in the literature, private outdoor spaces offer a variety of benefits for older people (Curtis et al., 2007). These could be physiological benefits, such as enhancement of physical health, and psychological benefits, e.g. stress reduction, satisfaction and well-being (Gesler, 1992; Burton and Torrington, 2007; Chalfont, 2005). Yet, in both houses and apartments, there are issues about the maintenance of outdoor spaces as older people may not be able to cope with gardens on their own. People-friendly outdoor spaces should not only be clearly defined but all features should be clearly identified. In particular, seating arrangements should be incorporated (see Figures 2.12 and 2.13), as older people feel tired more quickly and need a seat immediately.

Figure 2.12: Stair seat that engages with its surrounding spaces
Source: Alexander et al., 1977a

Figure 2.13: Resting spaces provided in outdoor spaces
Source: Author

Ageing is often characterised by limited activity due to restricted mobility, resulting in a loss of socialising. Therefore, for older people, their family, friends and other acquaintances need good access, as relationships with others provide a sense of attachment, enjoyment and security through their support. Social integration also gives older people a meaningful social function, a sense of value, purpose, identity and attachment to the community (Berkman and Kawachi 2000). Therefore whether the accommodation is a house or an apartment, it should encourage social activity.

Status

It is evident that older people sense a self-worth in the appearance of their house, apartment and surrounding local environment (Proshansky et al., 1970; Altman, 1975). Therefore, lack of control over these matters can have psychological effects on the quality of life of older people. Further, Madigan et al. (1990) argue in the literature about the significance of house ownership as a primary source of personal status and identity. Both houses and apartments can be a symbol of status for older people, but it is debatable how often it is actually achieved (Dupuis and Thorns, 1996).

Self-esteem

In the literature, the domestic built environment is analysed as an extension of self (Fuhrer and Kaiser, 1992). The house or apartment, style or architectural language, the interior design and decoration – all reflect the residents' sense of being (Despres, 1991a and b). The influence of past experience of place is strongly related to present experience. Bonds arise through the interplay of cause and effect, emotions, knowledge, beliefs, behaviour and actions in relation to a particular place (Altman and Low, 1992). The formation of these emotional and nostalgic bonds with the residential environment influences how older people perceive their identity (Proshansky et al., 1983; Altman and Low, 1992). The attachment to place is nourished by daily encounters with the environment and neighbours and continued personalisation of space (Brown and Werner, 1985; Werner, Altman, Brown, and Ginat, 1993). Yet, increasingly, it can be difficult for older

people to regularly go out and meet the neighbours, and even to maintain their home.

Privacy

The study by Nezlek et al. (2002) shows that the psychological well-being of elderly people is related to the quality of their social interactions and how much control they have over their interactions. An individual house can contribute to feelings of privacy and satisfaction, as having private space around the house adds to its seclusion. Yet, it could be a major concern for people living in multiple-occupation buildings. Privacy can be adversely affected where patios outside apartments lack clearly defined territory. Moreover, upper floor apartments may not have any external private space. It is also identified that, especially in multiple occupation, there can be a lack of hierarchy of spaces, both outside and inside the building i.e. public, semi-public, semi-private and private spaces (Evans, 2009) (See Figure 2.14). This could lead to compromising an acceptable level of privacy for the residents.

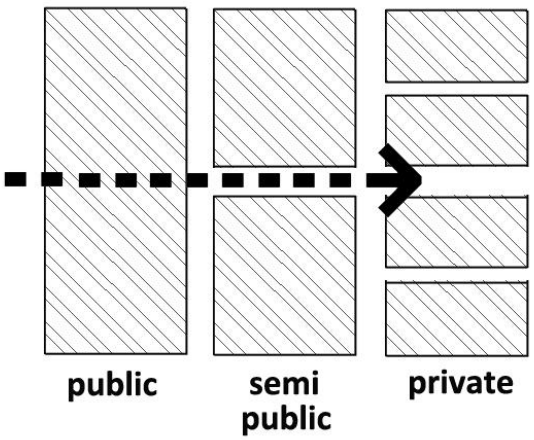

Figure 2.14: Gradation of spaces
Source: Author

It is also essential that the common areas are clearly separated from private accommodation as part of the hierarchy of progressive privacy (Alexander et al., 1977a; Torrington, 1996; Weenig and Staats, 2010). Areas that are accessible to the wider community should not impinge on the privacy of residents. The issues of privacy and disturbance are vital to the spatial

arrangement of apartments, common areas, staircases, lifts and service spaces (Altman, 1976; Archea, 1977; Barnes, 2006).

Beauty

Houses and apartments can both exhibit aesthetic quality through their external appearance and interior design. This can transform the living experience and improve quality of life. The disposition of houses and groups of apartments can enhance existing features in the locality, and create new ones (Day, 2004). It is also often the case that apartment buildings fail to demonstrate a human scale that stimulates the experience of home. It is also a more pleasant experience if the building form highlights the hierarchy of spaces within the building, appropriately defines the public and private domains and distinguishes the common areas from the apartments. This not only makes the whole building understandable, but also helps the elderly to find their way about (Passini, 1999; Passini et al., 2000). If the location of the entrance to the building is uninviting, this can be distressing for the elderly users. A spacious entrance area with appropriate seating provision and logical connections to common spaces creates a more comfortable approach to the apartment, especially for older people (Alexander et al., 1977a; Hertzberger, 2000) (see Figure 2.15).

Figure 2.15: Comfortable approach to the entrance

Source: http://www.tripadvisor.co.uk/LocationPhotoDirectLink-g29987-d229657-i103240644-BEST_WESTERN_PLUS_Prairie_Inn-Albany_Oregon.html

The composition of varied volumes, dynamics and vertical connections between spaces can achieve interest, excitement, comfort and delight (Day, 2004; 2002; Boyce, 2003) (see Figure 2.16).

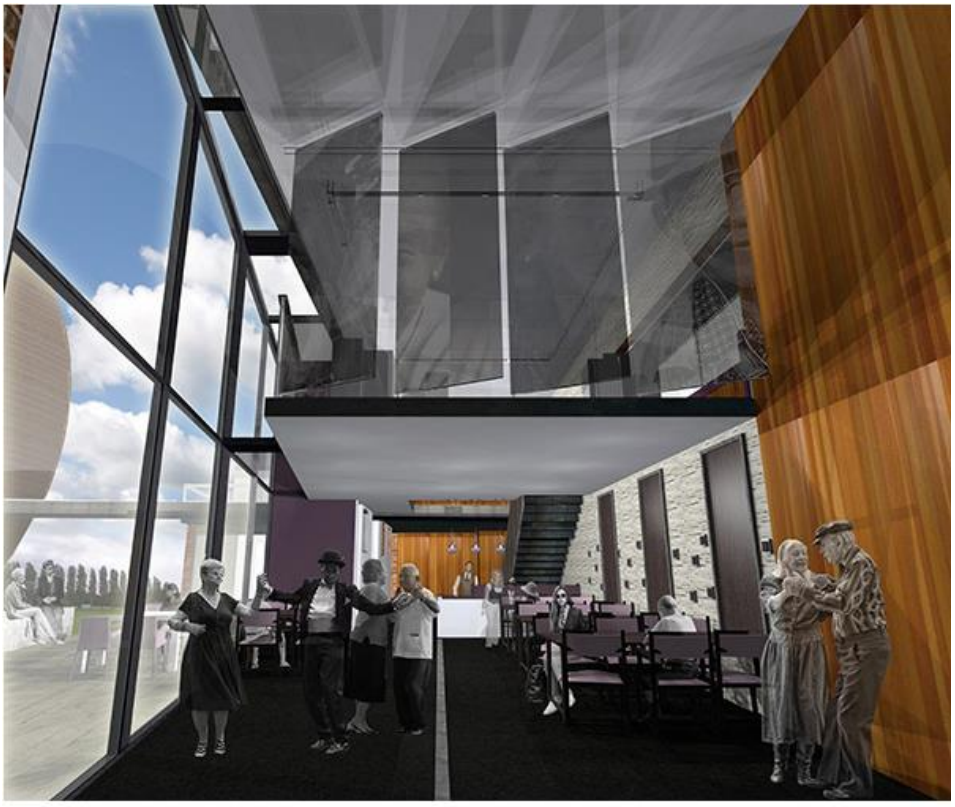

Figure 2.16: Interesting internal spaces
Source: Author

Consideration should be given to the provision of windows and the transparency of horizontal circulation (Beauchemin and Hays, 1996), Flexible casual sitting spaces within the circulation can promote a warm, homely feeling (see Figure 2.17).

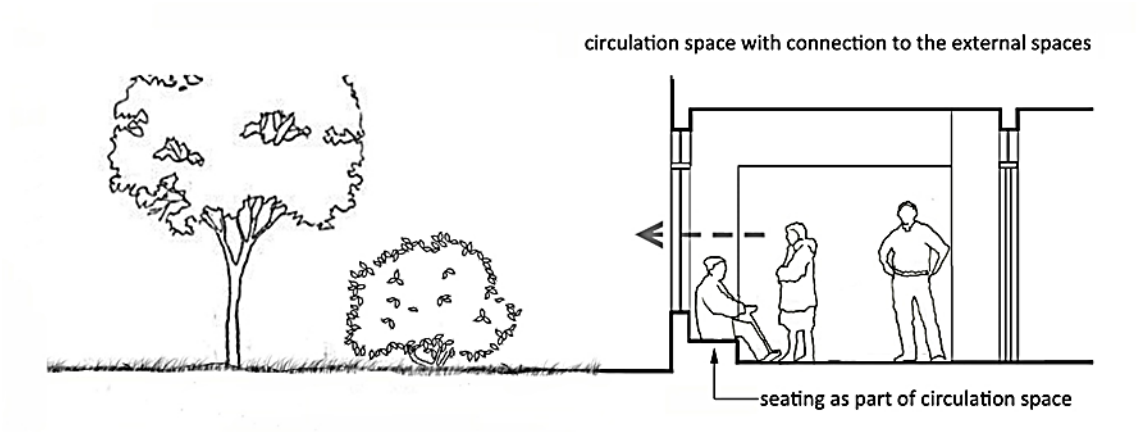

Figure 2.17: Casual sitting spaces
Source: Author

The accommodation should be oriented and configured to enhance views and allow access to private external spaces (see Figure 2.18).

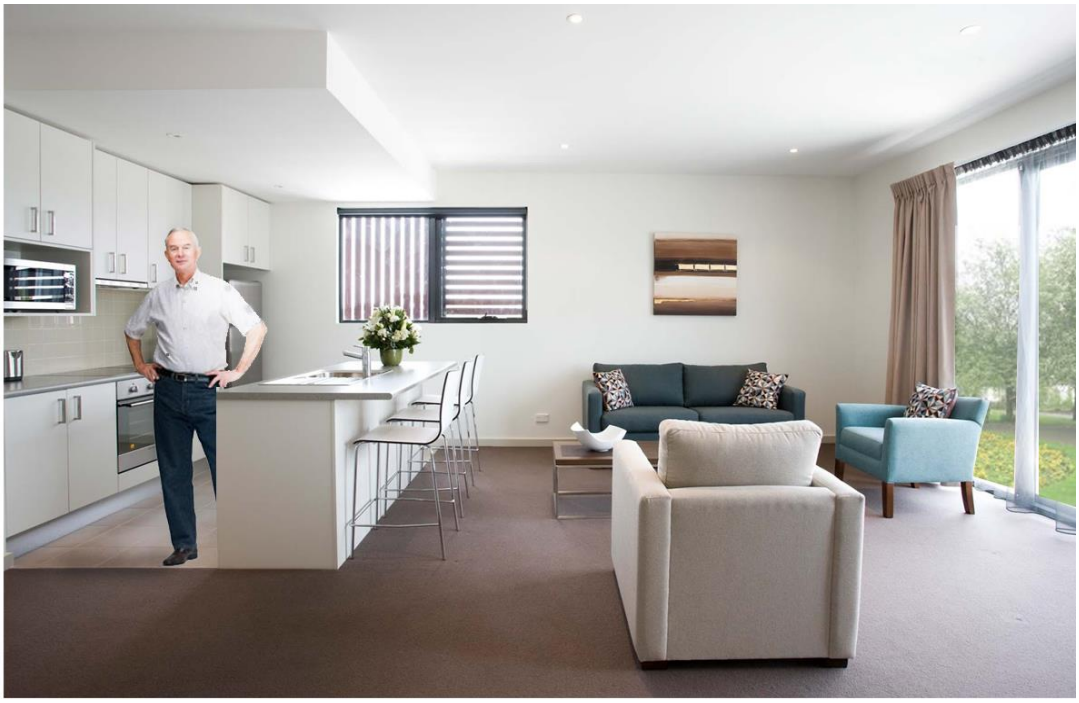

Figure 2.18: Enhancing views and access to external space
Source: Author

With better healthcare, new technologies and a more prosperous society, people are living longer. The age profile of the country's population is changing significantly and becoming older. With an increasing elderly population there are additional challenges to provide accommodation that will deliver quality of life for older people. Thus, it may be that general-purpose

houses and apartments are inadequate to meet the needs of older people, and that specifically designed accommodation is required. The objectives for accommodating older people have been set out in this chapter but it is important to determine how these issues could be identified and measured.

2.4 Design Quality

The debate about measurement of design quality has a long history, and this is reflected in the literature, especially from the era in which the Design Quality Indicator appeared as the first comprehensive system 'to measure quality of design embodied in the product – the buildings themselves' (Gann et al., 2003). Markus (2003) notes that the notion of the objective being easy to measure and the subjective being very difficult is not as telling as many seemed to assume. Indeed, he questions whether they are even the appropriate terms to use, and suggests that quantitative and qualitative may be more valid. Cook and Reichardt (1979) do not regard measurement as a choice between two extremes and consider it totally legitimate for an investigation or an appraisal to use a combination of quantitative and qualitative techniques. Yet, the importance of differentiating between performance and amenity goes back to Burt (1978); and any assessment of quality would benefit from an appropriate means of evaluating both attributes, in addition to assessing their integration into the design as a whole (Giddings and Holness, 1996). This concept is supported by Manning (1991) who established the distinction between Environmental Quantities and Environmental Qualities; and by Thomas and Carroll (1984) who identified a continuum between Practicality and Originality. Exploration of all these issues led to the development of a Quality Assessment Hierarchy. Although originally devised for use in design award schemes, as Gann et al., (2003) point out, this can equally well be applied to the quality of design proposals. Figure 2.19 represents a summary of the Quality Assessment Hierarchy.

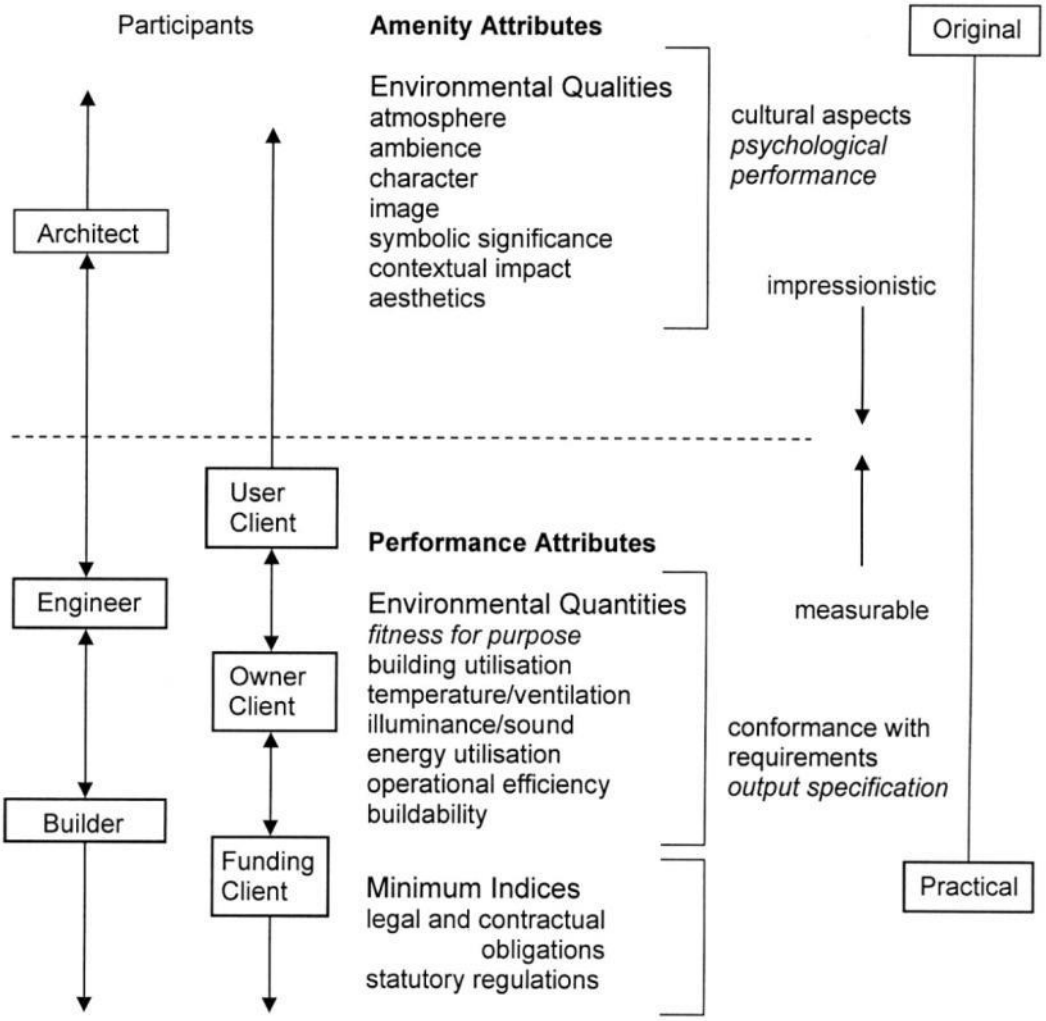

Figure 2.19: Quality Assessment Hierarchy (Giddings and Holness, 1996)

Having established the concept of home, and how its qualities particularly relate to older people, an analysis of how place and house can satisfy human needs, followed. The next objective was to align these provisions with the Quality Assessment Hierarchy to develop an evaluation system for older persons' accommodation. As identified in the analysis, place and house can provide for the human needs hierarchy – shelter, comfort, safety, security, belongingness, status, self-esteem, privacy and beauty. This provision is essential for both quality of life and for successful ageing (Torrington et al., 2004; Barnes, 2002; 2006; Moore, 2000a; Nezlek et al., 2002). Table 2.6 shows the issues in relation to human needs together with the issues identified in place and house – to establish the concept of home and quality

of life. The table also demonstrates the association between the human needs, their provision and how these could be assessed – based on the Quality Assessment Hierarchy (see Figure 2.19).

Table 2.6: Concepts of home and their assessment

Needs	**Provision**		**Assessment**	
Human needs	**Place**		**Amenity attributes**	
beauty privacy self-esteem status belongingness	aesthetic judgement character well-being attachment identity value and significance community interaction		aesthetics character atmosphere ambience image symbolic significance contextual impact	Psychological Needs and Performance
Human needs	**House**		**Performance attributes**	
security safety comfort shelter	threshold materials space types physical form		building utilisation buildability temperature/ventilation illuminance/sound energy utilisation operational efficiency	Physiological Needs and Performance
Concept of home and the quality of life			**Quality hierarchy**	

Source: Author

As a preamble to considerations about designing for older people's needs, houses and apartments in multiple occupation have been discussed to evaluate how appropriate these forms are for accommodating older people. The analysis also helped to determine how the various needs could be integrated. Existing research shows that as people age they prefer to stay at home, primarily for safety reasons (Torrington, 1996). This further emphasises the importance of the domestic environment. Thus, accommodating older people in suitable and stimulating environments has many benefits. However, it has been established that general-purpose houses and apartments may not offer those qualities, and specifically designed accommodation may be required. There may be a debate as to

what form this accommodation may take. One form that has become established is sheltered housing. Therefore, the next section will discuss, in detail, the case for sheltered housing and assess whether it is the most valid model to deliver physiological and psychological performance. Clearly, whatever form is the preferred house type, meeting the quality assessment criteria will be essential.

2.5 The Case for Sheltered Housing

This section of the study explores whether sheltered accommodation can offer an appropriate housing solution that can serve the needs of older people, as well as providing a setting that continues the independence of residents through improved housing quality. It has been shown that people who engage in social networks have a better psychological disposition and higher levels of physical function (Mullins and Dugan, 1990; Walker et al., 1998). Past studies have noted that sheltered housing can relieve concerns about safety, security and social isolation (Nocon and Pleace, 1999; Torrington et al., 2004).

As well as lowered physical performance and functional competence associated with ageing, it can also be that inappropriate architectural design hinders older people when using their domestic environment. This kind of architectural design is a result of environments that are designed and built predominantly for younger people, which can put older people at risk (Lawton, 1980; 1987). However the quality of architectural design for older people can be improved by focusing on their needs, which can give good results in terms of improved functional competence and enhanced quality of life (Lawton, 1998; Walker, 2006; Walker and Mollenkopf, 2007).

As there is no single accepted definition for sheltered housing, it is often used interchangeably with terms like retirement housing, care homes, and homes for the elderly. Therefore to clearly identify what this housing arrangement offers older people, it is important to explore sheltered housing as a concept. In general it consists of a unique combination of housing and communal support that avoids many of the shortcomings of institutionalised living, i.e. lack of independence and stimulation (Butler, Oldman and Greve,

1983). Bernard et al. (2007) define it as accommodation that allows older people to either rent or buy a range of housing and care services. In addition, Croucher et al. (2003) define it as a housing arrangement with a variety of amenities and activities, which create opportunities for casual and formal communal activity. This housing arrangement can provide a warm, convenient, secure apartment with communal facilities and an association with the neighbourhood, where older people can live independently without the worry of repairs or maintenance and also have the company of other people. Further, there is often a resident warden for assistance and care, i.e. 24-hour emergency help through an alarm system (Tinker et al., 2007). This service can also monitor resident well-being on a regular basis.

Alternatively, older people living in large family homes may wish to move into a bungalow, which is smaller, on one level, easy to live in and maintain, and providing manageable outdoor space. This reduction in size of indoor and outdoor space is important as it helps elderly people to live independently. However it is identified that due to physical limitations, they may have difficulty in maintaining their social network in this type of accommodation. In reality they could become isolated in their individual domestic space without any link with the neighbourhood community, whereas people prefer to live in a community. As independent houses, bungalows and apartments do not offer any kind of communal approach, these arrangements may not provide a solution that could offer a secure and social living environment.

To discuss, in detail, the case for sheltered housing and to access what could be the most valid model to deliver physiological and psychological performance, it is essential to evaluate the special features it offers.

2.5.1 **Physiological Performance**

For older people, home is especially important and central in daily living (Reschovsky and Newman, 1991). They desire secure and convenient spaces (Butler et al., 1983; Torrington, 1996). Sheltered accommodation can provide manageable, appropriately sized apartments with simple layouts that could be adapted to the varying needs of elderly people, e.g. easy access bathrooms and kitchens, handrails, widened doors in hallways and home

care alert (Torrington, 1996; Tinker et al., 2007). Suitable temperatures and appropriate light levels to support older people with cognitive, functional and sensory incapacity are also important (Barker, 2000; Department of Health, 2003). The building should also limit and control noise level, as it could alarm and confuse the elderly. The internal spaces should be legible in terms of their size, shape, form and use of materials. There should also be clear visual links between indoor spaces to create a variety of spaces which relate to one another in a readily identifiable way. Good-quality houses for older people not only provide physiological requirements such as shelter, comfort, safety and security but should also offer a domestic character. For many people, sheltered housing generates a sense of security and safety, a lack of worries about issues such as maintenance (Reschovsky and Newman, 1991; Croucher et al., 2003), and the reassurance of a warden's presence. Therefore sheltered accommodation can satisfy physiological needs.

2.5.2 **Psychological Performance**

It has been reported in previous research that social interaction, especially support from family and friends, is essential for older people (Nezlek and Reis, 1999; Nezlek et al., 2002). Some elderly people feel really anxious and sad that they need to leave their own homes, possessions, and their friends and family. The most beneficial element that sheltered housing may offer is the availability of communal facilities and other spaces for various social activities which enable residents to exercise their needs for meeting not only fellow residents but also a network of the wider community (Nezlek et al., 2002; Barnes, 2006). It is also acknowledged that outdoor spaces could offer a variety of benefits for older people. This could be either in the form of physical activities or simply experiencing the natural elements outdoors (Gesler, 1998; 2003; 2005; Gesler and Kearns, 2002). A number of studies confirm the concept of outdoor spaces as a communal facility (Burton and Torrington, 2007; Bowling et al., 2003; De Vries et al., 2003).

There is a concern that sheltered housing may have an institutional character, but good-quality sheltered housing actually provides a special domestic environment and could form a sense of community within the wider

neighbourhood. This environment not only provides social support but can also invite the friends and family to join the community. Social support from the immediate community engenders belongingness, and has been shown to have a significant positive impact on the self-esteem of residents (Baumeister and Leary, 1995). It is significant for older people to retain their independence for quality of life and to enjoy their lives. Sheltered housing can provide a suitable physical setting that promotes a feeling of own home which also retains independence. High-quality sheltered housing establishes the importance of dignity.

The design, composition and treatment of indoor and outdoor spaces should create enjoyable environments on a human scale. Such sheltered housing contributes to a sense of place, status and self-identity for its residents in the same manner as their own homes (Burton and Torrington, 2007).

2.6 Conclusion

This chapter presents the theoretical framework for the research, beginning with exploration of the Concept of Home and the Quality of Life. These are based on three components - Human Needs, Place and House. The next step focused on the seminal works that analysed these components and how all three needs to be aligned to create a high quality Home. The vital need for older people to enjoy a high quality of life, is related to overcoming the barriers that are associated with the ageing process. Therefore, an Older People's Perspective was examined and a number of issues identified that range from the importance of community to compensating for diminished functional capacity and re-establishing a sense of worth. In Accommodating Older People, their physiological and psychological needs were evaluated. This led to the adoption of the Quality Assessment Hierarchy, in which the performance attributes meet the former while the amenity attributes satisfy the latter, as a means of expressing Design Quality. Finally, The Case for Sheltered Housing demonstrates that it can be an appropriate arrangement for delivering high quality environments that satisfy physiological and psychological needs through performance and amenity attributes.

Chapter 3: Background to Building the Tool

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3.1 Analysis of Existing Design Quality Evaluation Tools

Having established the principles of the home, the next step is to determine how they might be recognised in a design proposal. There are a number of tools already available for assessing design quality. It is therefore necessary to determine if any of them would be suitable for application in this context.

3.1.1 **Design Quality Indicator**

This is the only truly comprehensive method for evaluating the design and construction of new buildings and refurbishment projects (Construction Industry Council (CIC), 2010). There is a general Design Quality Indicator (DQI) for all building types and a specific one for schools (http://www.dqi.org.uk, 2009), together with two subsets: the Achieving Excellence Design Evaluation Toolkit (AEDET) which focuses on hospitals, and the Design Excellence Evolution Process (DEEP) which is exclusively for military housing. During the latter part of the twentieth century, a new culture of performance measurement started to take hold across the UK construction industry. This was epitomised by *Rethinking Construction* (Egan, 1998). Architects and other design professions affiliated to CIC became concerned that design quality might be relegated to a secondary issue because of the performance-improving agenda, which was focused on physical processes. The concern was that a new generation of buildings might be produced where emphasis on measuring and reducing time, cost and waste would lead to a plethora of uninspiring designs (Gann et al., 2003). The response was the DQI, created explicitly to measure the quality of the design product.

The DQI consists of three elements:

- Conceptual Framework

- Data-gathering Tool
- Weighting Mechanism

The Conceptual Framework is represented as follows (see Figure 3.1):

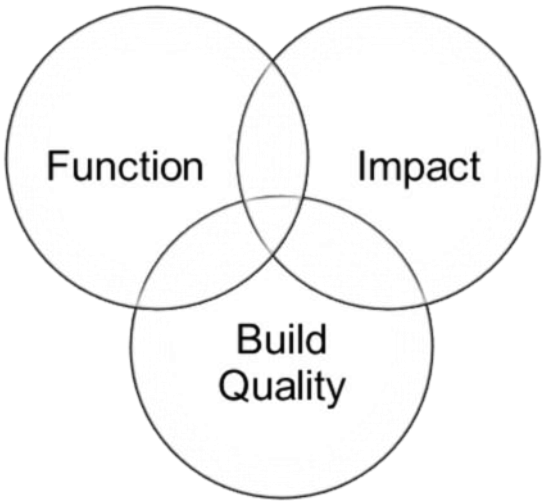


Figure 3.1: Conceptual Framework

Source: Gann et al., 2003

The justification for this arrangement is to reflect the overlapping qualities. Other models were rejected because they did not account for the interaction between the three aspects shown above. Gann et al. (2003) offer the example of lighting in a building; it can have a functional quality in terms of the lux (lumens per square metre) needed for specific tasks as well as providing pleasure. However, lighting does not have a single objective but is a means of satisfying part of the fitness for purpose and of generating part of the ambience. These aspects are quite different and the design criteria for one are not the same as those for the other. Moreover, amongst others, Veitch and Newsham (2000) have shown that fitness for purpose has been well researched, has accepted standards and these standards are generally achieved. Thus, it is not the overlapping nature that is significant but how to add amenity to function.

The data-gathering tool in the DQI is essentially a questionnaire that can be used by anybody involved in the design and use of the building (Whyte and Gann, 2003). Perhaps not surprisingly, the questions are framed around function, impact and build quality (http://www.dqi.org.uk/dqi/common/DQIRespondentGuidence.pdf, 2009). The respondents are asked to assign a weighting to the importance of each feature, on a Likert scale of 'strongly disagree' to 'strongly agree'. The mechanism uses the priorities that the various stakeholders have set for the building, and weights perceptions of design quality against these objectives (Markus, 2003). Responses to the questionnaire are weighted using a simple formula according to individual respondents' views on particular attributes in each section of design quality. As the DQI is effectively a questionnaire for individuals to complete, the weighting reflects their priorities. In the example offered by Gann et al. (2003) (see Figure 3.2) the nearest respondent to the users – i.e. the employers' agent – emphasises functionality, budget and letability. The closest that the employer's agent and the architect come to qualitative issues is that the former notes that the building is 'aesthetically pleasing' whereas the latter declares that he is 'satisfied with the comfort for the tenants'. However, the greatest weighting should be reserved for designs that additionally provide a sense of place and real well-being for the users (Giddings and Holness, 1996).

The tool does not provide realistic and objective measures of what is acceptable to meet aspirations. It cannot provide an absolute measure of the design quality of a building, but can be used to articulate the subjective qualities felt by different stakeholders in the design process and thereafter in the use of a building. However, the DQI and the version for schools in particular have been substantially criticised by practitioners as symptomatic of the wider culture of benchmarking and targets, and for encouraging superficial responses (http://www.architectsjournal.co.uk/does-the-dqi-process-work/5205841.article, no date).

Thus the DQI is not suitable as the basis of the Design Quality Evaluation Tool for three reasons. First, although a mid-design assessment tool has now been introduced, it is not as much about evaluating and developing the

designs as completing another generalised questionnaire. Secondly, the Conceptual Framework does not recognise the significance of a hierarchy of assessment, in which fitness for purpose can be added to the mandatory requirements and amenity attributes added to fitness for purpose. Each level is more difficult to achieve than the previous one, and this should be reflected in the weighting. Thirdly, with the DQI, the weighting itself is derived from individual respondents' views, some of which are barely related to design quality at all (Eley, 2004); whereas the objective of this research is to establish a shared framework, against which proposals can be assessed and progressed.

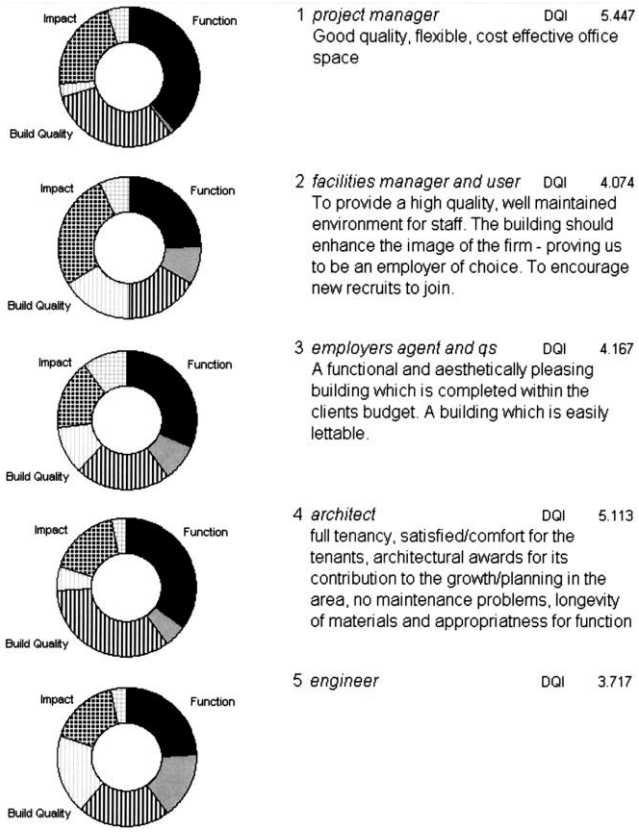


Figure 3.2: Comparison of different perspectives on design quality
Source: Gann et al., 2003

DQI Achieving Excellence Design Evaluation Toolkit (AEDET)

This tool is used for assessing the design of healthcare buildings from initial proposals through to post-project evaluation. It was developed by the NHS Estates Centre of Healthcare Architecture and Design. It offers support for developing specifications and evaluating the design of healthcare building

proposals. The set of evaluation criteria has been created from a number of sources, which include: the Patient Journey Model; Better by Design; the NHS Design Quality Portfolio technical and user criteria; the PFI Design Development Protocol; and the Model Design Quality Specification. The toolkit is for non-financial assessments and it includes a series of key questions supported by lists of related issues that need to be considered. The questions are answered by giving a numerical score (between one and six) into an Excel spreadsheet. The scores are automatically averaged from the answers in each of the ten sections and entered into a table and a radar chart. AEDET is clearly derived from the DQI and therefore is the subject of similar deficiencies (http://www.shine-network.org.uk/?p=module_articles &aid=122, no date).

DQI Design Excellence Evaluation Process (DEEP)

This tool aims to quantify design standards with the intention of delivering design excellence and minimising risk. An evaluation of users of military housing was undertaken by the Ministry of Defence (MoD) which led to the launch of the tool in 2001. It helps to offer assurance that projects comply with government construction policies and are value for money. It is a scored checklist that investigates the functionality, impact, build quality, sustainability and innovation of military housing projects. Assessments are carried out at three key stages; preparation; design development and construction; completion and occupancy. Each assessment is undertaken by a design review group (DRG) using an external DQI facilitator. At each stage, a spreadsheet is completed with the assessment expressed as a percentage, along with an accompanying report which provides commentary on both positive and negative aspects of the project. The design stage documentation actually contains some interesting concepts (http://webarchive.nationalarchives.gov.uk/+/http://www.defence-estates.mod.uk/publications/bdc/DEEP_Evaluation_Record.pdf, no date) but also much of the evaluation is not relevant to sheltered housing, and the DQI process is not appropriate for the competitive dialogue phase of PFI projects.

3.1.2 **Housing Quality Indicators (HQI)**

These were developed by Duffy, Eley, Giffone and Worthington (DEGW) on behalf of the former Department of Transport, Local Government and the Regions (and then the Office of the Deputy Prime Minister) and the Housing Corporation (now the Homes and Communities Agency). DEGW undertook a feasibility study into Housing Quality Indicators (HQI) between February and July 1996. In August 1998 a workable set of indicators were developed (DETR, 1997). The assessment tool was edited in 2008 and re-edited in June 2010 to fulfil the changing needs.

The indicators were designed to assess the quality of a housing project in order to ensure that public funding achieves the best value for money (http://www.homesandcommunities.co.uk/hqi, 2009). The system allows an assessment of quality of housing in three main categories:

- Location
- Design
- Performance (DETR, 1997)

These three categories generate ten quality indicators that give the most useful information about the strengths and weaknesses of a scheme. The quality evaluation derived from using the system does not provide a direct association with financial value, nor does it not set out standards. Most of the indicators used for the assessment by the tool are based on the building regulations, as well as other mandatory or recommended standards. For example, the size of the properties are established from the 'Design of Lifetime Homes'; and their closeness to amenities and how they fit in with the locality are taken from 'Secured by Design Principles' (http://www. homesandcommunities.co.uk/hqi, 2009).

The HQI was devised to assess housing for the general population. It is not intended to cover the specialist requirements for sheltered housing, with the exception of *designated supported housing for older people* (Housing Corporation, 2008b). The design and quality standards associated with supported housing state that the core will apply in part, together with

additional provisions to housing for older people (Housing Corporation, 2007a). Even setting aside these partial provisions and ambiguities, Franklin (2001) points out that design quality assessment using this tool is merely related to standards and measurement. She adds that unless attempts are made to engage with more interpretative issues, appraisals of housing design will continue to be limited to mechanistic and deterministic formulations, which have led to so many failures in the past. A section on character has been added to the current HQI, but it represents only 2.5% of the total assessment (Housing Corporation, 2007b*)*, and the responses of 'yes, no or not applicable', appear insufficiently distinctive. Thus, the HQI is not a good fit for assessing architectural design quality in sheltered housing.

3.1.3 **Building for Life**

Initiated in 2001 by the Commission for Architecture and the Built Environment (CABE), Building for Life uses a comprehensive, evidence-based system for assessment of urban design quality for homes and their neighbourhoods against the 20 Building for Life criteria (CABE, 2005a).

The document sets out its 20 questions under the following headings:

- environment and the community
- character
- streets, parking and pedestrianisation
- design and construction (CABE, 2008)

The framework allows anyone to undertake an informal assessment, but formal assessments can only be carried out by an accredited Building for Life assessor (http://webarchive.nationalarchives.gov.uk/20110107165544/http:/www.buildingforlife.org/assessments, 2009). The criteria essentially provide a framework to assist planners and developers to review the quality of proposed residential developments and ensure that a proposal is adopting best practice. Each question is supported by examples of good practice and national planning policies, demonstrating that the principles behind the questions are deliverable and enforceable. The tool discusses the standards which should be achieved. Projects are awarded an overall score out of 20

and accordingly graded as ‘very good’, ‘good’, ‘average’ or ‘poor’ (Housing Corporation, 2008a).

It could be argued, however, that the assessment framework does not provide any support for enhancing schemes that are scored as average or poor. Also, the tool is framed to assess quality issues on an urban design scale and does not address single buildings (CABE, 2008). In addition, it is aimed at assessing the quality of a finished product and is not suitable for assessment for quality at the design stage (http://www.designcouncil.org.uk/Documents/Documents/Publications/CABE/delivering-great-places-to-live.pdf, 2009).

3.1.4 **Sheffield Care Environment Assessment Matrix (SCEAM)**

This matrix was developed as part of the Design in Caring Environments (DICE) Project by the University of Sheffield. It aims to evaluate the building from the point of view of the people living in it and to aggregate a large number of building features into a set of numeric scores (Parker et al., 2004). The SCEAM matrix (Barnes et al., 2002) was devised specifically to explore the relationship between physical environment and quality of life in such a way as to facilitate building appraisal to support building audit and facilities management. The assessment is more of a performance evaluation as the matrix used is based on assessing individual building features to identify the areas of improvement (Parker et al., 2004). The matrix is fundamentally a questionnaire which evaluates the physical aspects of the building and environment against the requirements of the users. It also helps to identify the problem areas a scheme by comparing the responses given by the users against a theoretical ideal building (Torrington, 2004).

SCEAM is not suitable as the basis of an architectural design quality evaluation. Even though the assessment tool does empower users and highlights the non-performing design elements, the quality of the responses is critically dependent on resident and staff perceptions. Therefore, the matrix is not as much about evaluating and developing designs but really about completing the questionnaire for an occupied building.

3.1.5 **Evaluation of Older People's Living Environment (EVOLVE)**

EVOLVE was developed in 2010 by the University of Sheffield with the Personal Social Services Research Unit (PSSRU) at the University of Kent, supported by the Housing Learning and Improvement Network (Housing LIN). Focus group discussions are used to explore how the design and living environment in extra-care housing meets the needs of residents and their relatives (Barnes et al., 2011).

The tool consists of a set of checklists relating to user requirements in 13 key areas or domains. The domains identified by the tool fall into two groups:

- the universal requirement domains: comfort and control, dignity, personal care, personal realisation, socialising within the scheme, connection with the wider community;
- the domains specific to old age: accessibility, physical support, sensory support, dementia support, safety, security, working care.

This electronic checklist incorporates all areas used by residents, including: apartments and bungalows, communal facilities, circulation spaces, staff facilities, scheme site and location. A percentage score is then produced for each of the domains (Lewis et al., 2010).

This tool is not appropriate for the evaluation of sheltered housing designs for the following reasons. First, the methodology incorporated to collect the data is only based on responses from the focus groups. Secondly, the focus group participants are invited to participate, possibly skewing the results. Thirdly, understanding of the use and barriers to use of built environment of extra-care housing schemes might have benefited from evidence collected via direct observation as well as or in combination with the focus groups (Barnes et al., 2011). The assessment tool still remains rather undeveloped in terms of generating a comprehensive evaluation of the design of care home buildings (Barnes et al., 2011).

3.1.6 **Usability of Workplaces (USE)**

The USE tool has been developed by the International Council for Research and Innovation in Building and Construction (CIB) working commission on Usability of Workplaces (CIB W111). It focuses on office and educational buildings and assesses the operational perspective, which greatly assists facilities managers in assessing the usability of their buildings (Blakstad et al., 2010).

The tool defines a systematic approach to evaluate the usability of buildings for an organisation. The entire process of assessment is based on questionnaires for mapping usability and consists of five stages ending with an action plan for the organisation involved. At each stage, there is a general (preliminary) introduction, followed by a description of the goals for that stage, the methods used, and the expected results (see Figure 3.3).

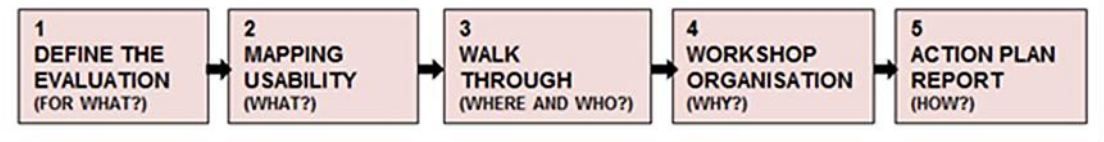


Figure 3.3: USE tool framework
Source: Blakstad et al., 2010

This tool supports continuous building improvement, and is excellent for carrying out measurements of operational efficiency, effectiveness and satisfaction with the finished product. However, the tool is not usable for evaluating architecture design quality of a sheltered housing.

3.1.7 **Building Research Establishment Environmental Assessment Method (BREEAM)**

This is the most commonly used environmental assessment tool in the UK. The BREEAM rating system was launched in the UK in 1990 by the Building Research Establishment (BRE), in collaboration with private developers (http://www.breeam.org, no date). The assessment method uses a credit-based system to produce a rating of environmental performance of ‘pass’,

'good', 'very good', 'excellent' and 'outstanding' . The system helps to apply environmental criteria against which building performance can be checked. Some have argued that the scoring process is not suitable and suggested that the assessment certificate should reflect both the score and the rating (Starrs, 2010).

The BRE has now introduced a number of more specialised assessment methods, including BREEAM for schools, industrial buildings, warehousing and retail buildings. They also offer a 'bespoke BREEAM' for developments that do not fit into any other category, such as mixed-use developments. In addition, a 'sustainability checklist' for larger developments has been devised that is intended to be used by developers and local authorities (Brownhill and Rao, 2002). As this is an exclusively environmental tool, it does not cover the range of issues required for a comprehensive design quality evaluation.

3.1.8 **Code for Sustainable Homes (CfSH)**

The code was introduced in 2006 as a government initiative to replace the BRE Eco-Homes standards. Originally it was introduced as a voluntary process, but in 2008 the UK government made it a mandatory requirement for all new homes to be rated against the code. It produces a sustainability rating varying from one to six stars to communicate the overall sustainability performance of a home. The code only deals with energy matters.

3.1.9 **Post-occupancy Review of Buildings and their Engineering (PROBE)**

This review was launched in 2002 to survey and assess technical and energy performance and social aspects (such as comfort, satisfaction, productivity, perceived environment control, lighting, noise and light) (BRI, 2001) in a comprehensive, systematic and affordable way. The PROBE system uses a questionnaire for end users which include technical performance and energy performance indicators. As the name suggests, the review takes place after construction and not during the design process (Castro-Lacouture and Ramkrishnan, 2008), and is therefore not relevant to this study.

3.1.10 Leadership in Energy and Environmental Design (LEED)

LEED was developed by the US Green Building Council for the UK Department of Energy in 1998 (Lee and Burnett, 2008). It is perhaps the most recognised environmental building assessment method with registered projects in 24 different countries. It assesses the sustainability of the building and awards one of the four different ratings: Certified, Silver, Gold and Platinum. The tool is designed to be used throughout the design and construction phase, with a certificate awarded on building completion (Saunders, 2008). In a similar manner to BREEAM and CfSH, it is limited to energy and environmental aspects.

3.1.11 Comprehensive Assessment System for Building Environmental Efficiency (CADBEE)

This is Japan's green standard. CADBEE can be applied to both public and private buildings, residential and non-residential buildings (Sinou and Kyvelou, 2006). The tool is a self-assessment checklist that enables the design team to improve the environmental efficiency of a building during the design development process. The assessment is based on the design specification and expected performance. One observation on the CADBEE tool is that the number of credits seems to add complexity to the rating system and there are no credits that focus on economic sustainability. Again, this is an environmental efficiency tool.

3.1.12 Green Star Environmental Rating System

Launched in 2003 by the Green Building Council of Australia (GCBA), this rating system aims to reduce the environmental impact of buildings (GBCA, 2011). As well as evaluating environmental attributes, it assesses aspects that affect health and well-being issues, such as indoor environment quality and access to transport (GBCA, 2009). This system has nine categories and points are awarded for achieving specific credits in each rating category. One of the criticisms of Green Star is that it awards a rating for a building as designed, not as built. Research has shown that over 90% of buildings certified by Green Star at design stage translate into less than 10% reaching

that standard at construction stage (Warren, 2009). A summary of all the tools is shown in Table 3.1.

Table 3.1: Summary and critique of existing design quality evaluation tools

Name of tool and who developed it	Type of building; why and when tools were developed	Critique
Design Quality Indicator (DQI) Construction Industry Council (CIC)	Launched as an online toolkit in 2003 Devised to assess the functional quality of completed buildings Use on any building type (http://www.dqi.org.uk, 2009)	Generic building type assessment criteria; does not consider the specific requirements of sheltered housing Focuses on functionality, build quality, and impact the building has on its occupants and its surroundings, by completing generalised questionnaire rather than evaluating or developing the designs Quantitative and performance assessment, tends to neglect amenity issues Assessment based on issues that the parties to the process consider as important – no objective criteria Needs an independent facilitator who would be an additional party to the process Seminar style of assessment would be impractical in a bidding process operating in stages Criticism that completion was too late to be useful led to a design process version Has special version for schools

Table 3.1 (continued)

Name of tool and who developed it	Type of building; why and when tools were developed	Critique
DQI Achieving Excellence Design Evaluation Evolution Toolkit (AEDET) NHS, working closely with CABE, the CIC and Sheffield University	First published in 2001 and last updated in 2008 To assist NHS trusts and the NHS overall to understand the importance of design on physical environments (http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_082089, 2009)	Derived from individual respondents' views, some of which do not really relate to design quality Focuses on functionality, build quality, and impact the building has on its patients and staff Design briefing tool; determining and managing the design requirements Quantitative and performance assessment (http://www.selondon.nhs.uk/documents/1247.pdf, 2009) Can be susceptible to tick box exercise Outcomes can be susceptible to manipulation Impartial facilitator required Missed opportunity to improve design quality (http://www.pfcu.scot.nhs.uk/HomeEvents/Previous/25_05_08/AEDET250508.pdf, 2008) Established for staff and patients in the NHS and therefore not really relevant to sheltered housing
Design Excellence Evaluation Process (DEEP) Developed for the Ministry for Defence	Revised in 2003 Devised for military housing within defence construction projects (http://www.mod.uk/NR/rdonlyres/933BD9BE-5053-4642-8D6F-16DFF8FEE36D/0/DEEP_user_guide.pdf, 2009)	Derived from individual respondents' views, some of which do not really relate to design quality Performance assessment; certifying fitness for purpose and value for money Compliance with minimum standards (http://www.mod.uk/NR/rdonlyres/F7DBAF24-FC86-4A24-A10F-FE6798A03516/0/deep_eval_record.pdf, 2009) Specific to military housing and therefore limited relevance to sheltered housing (http://www.mod.uk/NR/rdonlyres/E9EA71D4-248F-4692-B2EC-7FAAA3147369/0/deep_summary.pdf, 2009)

Table 3.1 (continued)

Name of tool and who developed it	Type of building; why and when tools were developed	Critique
Housing Quality Indicator (HQI) assessment tool (version 4) System was developed by DEGW on behalf of the former Department of Transport, Local Government and the Regions and the Housing Corporation	Edited in 2008 and re-edited in June 2010 Assesses the quality of a housing project Aimed at affordable housing, new building bids, refurbishment schemes, standard house types, single units and small schemes Housing Corporation, 2008b	Assessment is limited to standards and measurement Based on objective facts or on measurement Tool can be cumbersome to use Assessment of quality in three main categories: location, design and performance Predominantly assesses the more quantitative issues of design, that could be included in an output specification and measured Not a tool for considering subjective aesthetic qualities Not intended to cover the specialist requirements for sheltered housing
20 Building for Life Commission for Architecture and the Built Environment (CABE), in association with the Home Builders Federation, the Civic Trust and Design for Homes	Founded in 2001 and last updated in 2008 For design quality of homes and neighbourhoods Specifically initiated for housing development (http://www.designcouncil.org.uk/Documents/Documents/Publications/CABE/delivering-great-places-to-live.pdf, 2009).	Criteria based on national planning policy guidance and urban design principles Quantifies the result and is subjective in nature Initially applied to completed housing developments but later used as a planning tool (http:/www.buildingforlife.org/assessments, 2009) Operates on an urban design scale (CABE, 2008)
Sheffield Care Environment Assessment Matrix (SCEAM) Design in Caring Environments (DICE) Project University of Sheffield	Started August 1999: completed March 2003 For extra-care housing	Aims to quantify the experience of the people living and working in extra-care housing Assesses environmental features that are associated with quality of life Post-occupancy survey, measures user satisfaction Check list tool

Table 3.1 (continued)

Name of tool and who developed it	Type of building; why and when tools were developed	Critique
Evaluation of Older People's Living Environments (EVOLVE) University of Sheffield with PSSRU, University of Kent	Launched 2010 Focuses on design and living environment in extra-care housing to meet the needs of residents and their relatives	Developed from research into extra-care housing Survey format is essentially a set of checklists Measures user satisfaction 'Yes', 'no', 'not in use'/'not applicable' type answers to checklist statements – therefore not possible to score design development Only considers performance aspects
Usability of Workplaces (USE) International Council for Research and Innovation in Building and Construction	Started 2009 Focuses on education and office buildings	Supports continuous building improvements - excellent tool for property owners and facilities managers who will carry out assessments of usability Building usability tool – measuring operational efficiency, effectiveness and satisfaction Performance assessment tool that examines use of internal resources Not related to sheltered housing
Building Research Establishment Environmental Assessment Method (BREEAM) Building Research Establishment (BRE)	First launched in 1990 Environmental assessment method; rating system for all building types. (http://www.breeam.org, no date)	Checklist tool; broad range of categories and criteria from energy to ecology in checklist form Performance assessment Requires trained assessor, and tool can lack transparency Only measures environmental issues – not design quality
Code for Sustainable Homes (CfSH) Department for Communities and Local Government	Introduced 2006 To replace BRE Eco-Homes standards	Only deals with energy

Table 3.1 (continued)

Name of tool and who developed it	Type of building; why and when tools were developed	Critique
Post-occupancy Review of Buildings and their Engineering (PROBE) Funded by Building Services Journal and Department of the Environment, Transport and the Regions	Research project 1995–2002 Used for commercial and public buildings to assess the technical performance of the buildings	Assesses building performance 2–3 years after completion Measures user satisfaction Assessment of technical , energy and social performance of the buildings Survey performance assessment tool Not relevant to sheltered housing and not applicable to design stage
Leadership in Energy and Environmental Design (LEED) Developed by US Green Building Council for UK Department of Energy	1998 Environmental building assessment method	Used throughout the design and construction phase Similar to BREEAM and CfSH Limited to energy and environmental aspects
Comprehensive Assessment System for Building Environmental Efficiency (CADBEE) Japan Green Build Council	1999 Public and private, residential and non-residential buildings, developing experience from BREEAM and LEED	Self-assessment checklist enabling improvement of environmental efficiency during design process Based on design specification and expected performance Number of credits adds complexity to rating system Energy efficiency tool
Green Star Environmental Rating System Green Building Council of Australia	2003 Issues range from indoor environmental quality to access to transport as a means of assessing health and well-being	Aims to reduce environmental impact of buildings Rates designs which may be different from constructed buildings – a design and as built scheme is under development Primarily deals with greenhouse gas emissions, electricity and water usage

The critique in the above table illustrates that although aspects of existing evaluation tools may be used during the competitive dialogue phase of PFI projects, none of them would be wholly suit the specific conditions. It was

therefore concluded that a new tool would need to be constructed for the purpose.

3.2 Critique of Output Specification

As shown in the previous section, none of the available tools that have been devised to assess design quality suit the PFI competitive bidding process. Therefore, it was clear that a new tool had to be generated from first principles. From the beginning, it was recognised that it would be appropriate to analyse the existing PFI documentation for guidance as to how the new tool could be structured. Therefore this section critiques the output specification in particular, and assesses its function and limitations. To add context to the critique, an exemplar sheltered housing project was selected, and a systematic appraisal of the building was undertaken to establish the principles of a design quality evaluation, and the role that the output specification could play in it.

The PFI documentation mainly consists of the instructions and guidance provided to the bidders, which includes the service delivery as well as technical, financial, commercial, legal and contractual information about the PFI bidding process. The North Tyneside Council output specification document, like any other output specification, has two parts. Part A, *Design and Construction Requirements*, details the standards that the bidders should meet in the design and the construction of the new and refurbished sheltered accommodation. Part B contains the *Facilities Management Service Requirements*, i.e. building maintenance, landscaping, cleaning, catering, security, etc., which is linked to the payment mechanism. Part A of the output specification document is essentially related to the delivery of design quality schemes, so only this part of the document is discussed in this research. Part A of the output specification document is referred to as the output specification document from this point.

3.2.1 **Output Specification Document**

The output specification document is a type of a performance specification. This document proposes the performance level to be achieved; however, it

does not suggest how that could be achieved. The document is important as it should clearly and accurately state the requirements and describe the necessary scope, design parameters, functionality and features of the buildings to be constructed (HM Treasury, 1998). It covers issues such as accommodation, facilities and level of service and forms the basis for bidders to prepare their proposals (Astron, 2004).

Quantitative Performance Criteria

Unlike a technical specification, an output specification includes operational requirements of the project such as building maintenance, security etc. It is also fundamental in establishing the quantitative performance criteria for the PFI project. Seven principal categories are identified in the document: External Areas, Entrances, Communal Areas, Service Areas, Circulation, Apartments, and Architectural, Civil and Structural Requirements. Table 3.2 expands on the headings, to include issues that are raised in the specification.

Table 3.2: Quantitative performance criteria

No.	Categories	Issues	
1	External areas	• Access to grounds related to local patters and amenities	• Approach – access to the building • Boundaries • Gardens – private gardens • Car parking • Defensible space
2	Entrances	Main entrance: • sheltered • relationship with car parking area • orientation • defensible spaces (day and night) • internal character ‘hotel style’	• internal direction • colour • details • signage system incorporated. Other entrances and exits: • purpose and security • warden’s office

Table 3.2 (continued)

No.	Categories	Issues	
3	Communal areas	• Orientation • Number, size, flexibility • Grouping of various communal spaces – privacy • Heights	• Easy access to garden and security • Colour and details • Shops and public amenities • Views – within building and to exterior
4	Service areas	• Laundry • Plant room • Stores	• Cycle and buggy store • Refuse bins • Efficiency and effectiveness of removal
5	Circulation	Horizontal: • configuration: use of daylight and passive solar energy • length, size, height • orientation • resting spaces	Vertical: • lifts : number, location and type • staircases: number, location • means of escape
6	Apartments	• Number and size • Ratio of 1 to 2 bedrooms • Size and proportion of each space • Layout • Orientation • Patio gardens	• Natural light and view • Flexibility • Partitions • Acoustics • Storage • 'Hotel style' finishes • Apartment entrances – opportunity to personalise
7	Architectural, civil and structural requirements	Thermal efficiency of the building envelope: • masonry • timber frame • steel frame Elements: • walls • roofs • windows • doors External materials • scale – domestic	• durability • 'non-institutional' finish Elevation and roofs: • patterns • details • colour Internal construction: • floors • internal walls and partitions – fire protection Fittings and fixtures Lighting

Evaluation of Performance Criteria

The characteristics of output specifications are that measurable performance targets are stipulated for the physical assets and services by the public agency, leaving the contractors to innovate and achieve them. In a typical PFI document, the design evaluation is supposed based on performance criteria, because that is the intention of the output specification. However, the

example of the New Build Apartment section from North Tyneside Council (see Figure 3.4) does not even include measurable criteria, except in terms of overall requirements.

New Build Apartments

- **Number and size**

The minimum Net Internal Floor Area of 1 bedroom and 2 bedroom apartments shall be $55m^2$ and $65m^2$ respectively.

- **Ratio of 1 to 2 bedrooms**

The Contractor shall provide a range of 1 and 2 bed Apartments, with a minimum of 25% 2 bed Apartments across the New Build Schemes.

- **Size and proportion of each space**

The minimum widths of rooms shall be in accordance with the recommendations of Stephen Thorpe and Habinteg Housing Association Ltd (2006) Wheelchair Housing Design Guide, Second Edition (BRE Press). The single bedroom (applicable to 2 bedroom Apartments only) shall be large enough to accommodate a single bed, as well as other standard bedroom furniture.

- **Layout**

Each 1 bed Apartment shall comprise the following rooms:

i) One double bedroom;
ii) Living room;
iii) Kitchen; and
iv) Bathroom.

The 2 bed Apartment shall also accommodate an additional single bedroom.

The double bedroom shall be large enough to accommodate either a double bed or two single beds, as well as other standard bedroom furniture.

The bathroom shall be accessible from the hallway and shall have the potential to be accessed from the double bedroom if required in the future. It shall accommodate a toilet, a wash basin, and a level access shower. The shower area shall be designed such that a bath can be installed, connecting into the floor gulley of the shower, whilst allowing for its removal and simple conversion to a level access shower should the need arise in the future. The Authority will give Tenants the choice of either a bath and shower, or just a shower, and the Contractor shall supply and install baths as required.

Kitchen layouts shall be designed to accommodate wheelchair access and kitchen fittings shall be designed to facilitate modification and change of working height to meet needs with the minimum effort and cost. The Contractor shall position all kitchen fittings and equipment at heights that remove the need for over-stretching, bending or climbing. The Contractor shall provide transparent doors to two of the kitchen cupboards, such that the contents of the cupboard are visible to the Tenant. Grab rails are not generally required in bathrooms in Dwellings, except where specifically required by a particular Tenant. However, all internal walls to toilet and bathroom areas shall be sufficiently robust to enable grab rails and other access equipment to be fitted at a later stage if required.

In accordance with DDA requirements, the hallway in each Dwelling shall be large enough to accommodate a wheelchair and shall incorporate an electric point for wheelchair charging.

- **Orientation**

The Authority has a strong commitment to the creation of Sites that demonstrate a high degree of sustainability with regards to their impact on the environment. The Contractor shall ensure that their designs maximise use of daylight and passive solar energy.

- **Patio gardens**

They shall be designed to be secure and private, so as to prevent access and overlooking by the public where possible. A specific area shall be designated within the overall garden area for Tenants to do their own gardening. This designated area shall incorporate raised beds.

- **Natural light and view**

Living room areas should allow for people being able to see out of the windows whilst seated**.** Natural light shall be provided in all public spaces and in all occupied spaces within the Properties as far as is practical. Natural and artificial light sources should be designed to avoid or minimise glare. Window area and sill height, privacy and security requirements will

require special consideration for ground floor accommodation to allow sufficient daylight and views out whilst maintaining privacy from people outside the Properties.

- **Flexibility**

Internal walls shall be designed to accommodate modifications to the internal layout of the New Build Properties, which may be required to meet the changing needs of Tenants over time, as in accordance with section 2.3.2.1. Kitchen layouts shall be designed to accommodate wheelchair access and kitchen fittings shall be designed to facilitate modification and change of working height to meet needs with the minimum effort and cost. Bathroom and toilet fittings shall be designed to facilitate modification and change of working height to meet needs with the minimum effort and cost.

- **Partitions**

Internal wall construction shall be robust and appropriately specified for the activities to be carried out. In particular, walls to circulation spaces shall be designed to resist damage from wheelchairs. Internal walls to toilet and bathroom areas shall be sufficiently robust to enable grab rails and other access equipment to be fitted at a later stage if required. Internal walls to living and bedroom areas shall be suitable for the fitting of a curtain rail or blind above a window or within a window recess. Internal wall construction shall meet the acoustic requirements as set out in section above.

- **Acoustics**

Sound insulation shall as a minimum match the sound insulation performance given in the latest Building Regulations Part E (when tested at completion). The Authority requires the New Build Sites to be designed to limit the level of noise to a level that provides a comfortable and enjoyable environment for Tenants of each Dwelling. In particular, the Contractor shall ensure that noise penetration into Dwellings from neighbouring bathrooms is limited to NR 25 (i.e. noise from a toilet flush) and that noise penetration into Dwellings from the laundry is limited to NR 25 for bedrooms and NR 30 elsewhere within Dwellings, as per the requirements of E1, E2 and E3 of the Building Regulations. Rain shall not cause the background noise level to exceed acceptable levels as defined in the guidance given in BS 8233 1999 ‘Sound Insulation and Noise Reduction for Buildings Code of Practice’. The Contractor shall comply with the specific requirements in section in relation to noise from plant and equipment.

- **Storage**

The Contractor shall incorporate dedicated areas for storage within each Dwelling, the majority of which shall be accessed from the hallway. The store shall be designed to allow as a minimum 1 cubic metre of easily accessible storage space per apartment. The Authority may consider a ‘bulky items’ store being housed within individual apartments if bidders can demonstrate that sufficient ‘long term’ storage is provided **in addition** to the storage required for day-to-day items such as vacuum cleaners, ironing boards etc.

- **Finishes and hotel style**

Internal finishes shall be of high quality and shall:
be non-institutional; with a “hotel style / Apartment style”;
be durable and robust;
be easy to maintain;
promote accessibility;
be compatible with other finishes and with fixtures, fittings and equipment; and address other considerations as identified by the Contractor.
The Contractor shall provide wall and ceiling finishes throughout the Properties. The Contractor shall also provide floor finishes to all Communal Areas, and to kitchens and bathrooms in Dwellings.
Floor finishes to all kitchens and bathrooms shall be impervious and non slip.
Tenants have stated a clear preference for the properties to be designed in a “hotel/ Apartment style”, particularly in terms of the internal finishes, fittings, furnishing and signage etc. The Contractor shall adopt this approach for all properties and shall avoid creating an institutional appearance.

- **Apartment entrances – opportunity to personalise**

Recesses off the corridor shall be provided to the front door of apartments to create a sense of a private threshold and somewhere to place deliveries without obstructing the corridor, if required. The Contractor shall also consider the treatment of the front door and the recess in terms of wayfinding and creating individually recognisable entrances to each apartment.

Figure 3.4: New build apartment section of North Tyneside Council output specification document
Source: North Tyneside Council, 2008

Thus it is quite difficult to determine how bidders should respond to such a document, except in the basic terms of ensuring that all the stated provisions are included. Moreover, the Theoretical Framework chapter has shown that performance attributes are only part of the concept of home. It is important to identify performance targets but these alone cannot guarantee architectural quality (Ronn, 2011). The criteria framed in output specifications have been the only means of assessing the designs of proposed schemes (see Figure 3.5), and therefore significant qualitative data may have been missed in the past.

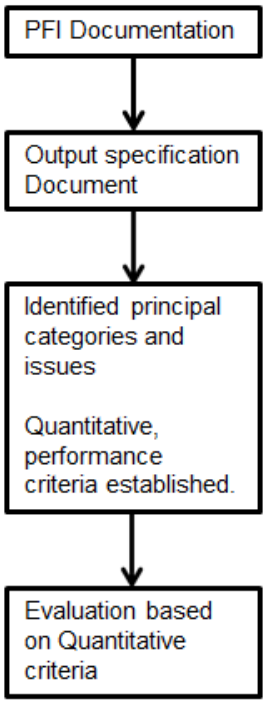


Figure 3.5: Map of typical PFI process
Source: Author

An Alternative Process

The output specification focuses only on measurable criteria and fails to acknowledge vital amenity aspects such as the appropriateness of the building to its wider context. Thus, these limitations further highlight the need

for the development of a new tool that would emphasise the *amenity attributes* without neglecting *performance attributes* as identified in the design quality hierarchy diagram (See Figure 2.19). Table 3.3 reprises the items included under each heading.

Table 3.3: Extract from Design Quality Hierarchy Diagram

Quality Hierarchy Assessment
Amenity Attributes
aesthetics
character
atmosphere
ambience
image
symbolic significance
contextual impact
Performance Attributes
building utilisation
buildability
temperature/ventilation
illuminance/sound
energy utilisation
operational efficiency

Source: Author

This analysis has opened up an alternative perspective, which needs contextualising. CABE (2005b) proposed that service delivery would be improved by the study of exemplars. It was therefore decided that the alternative perspective should be appraised through an exemplar. However, before visiting the exemplar, the principal categories and issues from the output specification were reviewed. This re-appraisal helped to set the agenda for the exemplar visit and would assist in the process of documenting the experience. The objective was not only to appropriately document the *performance attributes* identified from the output specification but also identify the *amenity attributes*. Further, the output specification was helpful in comparing the functional requirements with the actual scenario in the exemplar building.

3.3 Evaluation of an Exemplar Sheltered Housing Project

As stated in the Critique of the Private Finance Initiative (pp. 3-5), when the Commission for Architecture and the Built Environment was established as the government's consultant on architecture, it concluded that the vast majority of PFI buildings commissioned to date had not been designed to a high enough standard; and that a qualitative improvement was urgently needed. It proposed three principal means to generate this improvement – appointing client design advisers, studying design exemplars, and undertaking post-occupancy evaluation (CABE 2005b). It has been demonstrated that North Tyneside Council took these recommendations seriously and appointed client design advisers early in the programme. It was concluded that one pre-eminent exemplar would be sought as a means of studying and reflecting upon a high quality environment. Thus the purpose of the study was to generate the overall structure of the tool and reflect on the standards that would be required.

The sheltered housing scheme Plas Y Mor, Burr Port was chosen as the most appropriate example (see Figure 3.6). It was completed in 2003 and received a number of awards such as National Eisteddfod of Wales (Finalist) 2004, Western Mail Property Awards 2005 for Best Residential Project and Innovation in Design, Civic Trust Award 2005, International Green Apple Awards Bronze 2006, The Prince's Foundation for Integrated Health Award (Finalist) 2008 (http://www.pcko.co.uk).

Plas Y Mor comprises a day centre facility and 38 self-contained one- and two-bedroom flats arranged around a communal external garden. This scheme not only achieved high standards in architectural design but is also nationally well-regarded for its commitment to improve the lives of older people by integrating residential accommodation with essential services, leisure and care facilities (http://dcfw.org/media/casestudies).

Figure 3.6: Perspective view and front view of Plas Y Mor, Burry Port, Swansea, West Glamorgan

Source: http://www.pcko.co.uk/word/wpcontent/uploads/2011/10/PCKO_30_yrs_Exhibition_Catalogue.pdf

The structure of the study followed the headings from the output specification (see Table 3.2), as a means of collecting of data in a consistent manner.

External Areas

The design concept is derived from traditional terraced houses, typical of this part of Wales. The design of the building is an environmentally responsive form of construction. The external spaces around the building interact well with the context, contributing to the local character of the area and the sense of place. The elevations respond to the materials featured in the surrounding buildings, and also create interesting contrasts with complementary materials. The design is well integrated with the existing streets, footpaths and cycle paths, etc., providing good access to existing local amenities and shops. All external spaces are accessible for users with physical disabilities, visual or sensory impairment. For example changes in levels are clearly identified and designed to assist accessibility for all.

The entry to the site is clearly defined on arrival and the approach is marked with a change of surface. There is a logical and unobstructed relationship and progression between entering the site and the main entrance to the building. The boundary materials and treatments are attractive, durable, and of appropriate scale in relation to the building and surroundings. The boundary treatment to the front of the building has a positive impact on the building and the neighbouring properties (see Figure 3.7).

Figure 3.7: Site entry (left) and clear logical approach to the building entrance (right)
Source: Author

The external spaces are legible, clearly defining the hierarchy of external spaces and aiding progression from outside to inside. The external spaces not only provide a setting for the building but are also used to arrange the massing. The whole design is focused around a courtyard garden with glazing that provides visual transparency and enhances the connection to the wider community (see Figure 3.8). All external spaces are appropriately oriented to maximise sunlight and enhance use. Consideration is also given to provide access to external space from the individual apartments, via patios and balconies (see Figure 3.9). Security benefits from natural surveillance of private and public external spaces. All external spaces are overlooked from the glazed link and apartments to maximise security.

Figure 3.8: Linking glass foyer and the courtyard garden (left) and courtyard garden overlooked from the building (right)
Source: Author

Figure 3.9: Courtyard garden space with sitting spaces (left) and other external spaces around the building (right)
Source: Author

The car parking area is located close to the main entrance of the building for clear and convenient access. Consideration is given to the design of the parking, so that it blends with the overall landscaping and provides a

coherent and inviting entrance (see Figure 3.6). Again the natural surveillance is achieved by the intelligent design of the entrance, the communal areas and the apartments, which all overlook the car parking area. However, the design does not demonstrate a separate, clear and safe pedestrian access route to the main entrance from the car park.

Entrances

The entrance contributes appreciably to the sense of scale of the building. It also encourages a good level of natural surveillance, both day and night (see Figure 3.10). The spacious entrance foyer, with appropriate seating provision, double height volumes and logical connections to shared communal spaces, creates a welcoming atmosphere. The space, light and furniture create the feeling of an inside–outside space, which is a departure from the typical sheltered space (see Figure 3.11). The spatial planning helps to visually link the various spaces to create a disciplined variety of spaces which relate to one another in a readily identifiable way.

Figure 3.10: Main entrance in the daytime (left) and night-time (right)
Source: Author

Figure 3.11: Spacious entrance area with appropriate seating provision

Source: Author

Communal Areas

All the communal spaces are located in the most accessible areas and have a logical relationship to the main entrance. This arrangement of communal spaces in the form of a hub not only benefits the residents of this scheme but also the residents of the neighbourhood. The communal areas and the entrance foyer provide comfortable seating for users. These areas also have natural light to create a welcoming environment that encourages community integration. The external form of the building suggests what is happening inside, i.e. communal activity is placed at the front of the building, facilitating easy way-finding (see Figure 3.12). The visual connections between the communal areas help to signal their use without the need for signage.

Figure 3.12: Different views of the southerly-oriented main communal space

Source: Author

Figure 3.13: Dining area with external connections (left) and main communal space (right)

Source: Author

Figure 3.14: Internal view (left) and external view (right) of the smaller sun lounge

Source: Author

Figure 3.15: Interior view of the main communal space, highlighting the importance of the low windows

Source: Author

In addition to the main communal space, the scheme has a variety of lounge areas for different purposes. There is an intimate sun lounge, which is used for quiet reading and for small gatherings, with privacy and little disturbance (see Figure 3.14). The spatial arrangement of the communal spaces provides an opportunity for good daylight and views. Additionally, the communal spaces have windows with low sills, which help residents to have views and connections with the outside while seated (see Figure 3.15). All the communal spaces are designed with adaptability, incorporating economical ways of creating valuable flexibility. Further, there is consideration to the spatial relationship and movement between different subspaces, including their accessibility for wheelchairs and walking frames users (see Figures 3.13 and 3.14).

Service Areas

The scheme incorporates various services, such as a laundry room and assisted bathrooms (see Figure 3.16). All these services also form part of the day centre. They are well located and are suitably sized (see Figures 3.16 and 3.17). The buggies, however, are parked in the circulation spaces as the

scheme does not provide for a separate buggy store (see Figure 3.18). This is highlighted as inappropriate. Heating and hot water in this scheme is provided by a communal heating system powered by twin bio-mass boilers. The boilers are fuelled from locally procured wood pellets, which is an environmentally friendly heating fuel. Heating is also delivered by solar heating panels.

Figure 3.16: Laundry room (left) and assisted bathroom (right)
Source: Author

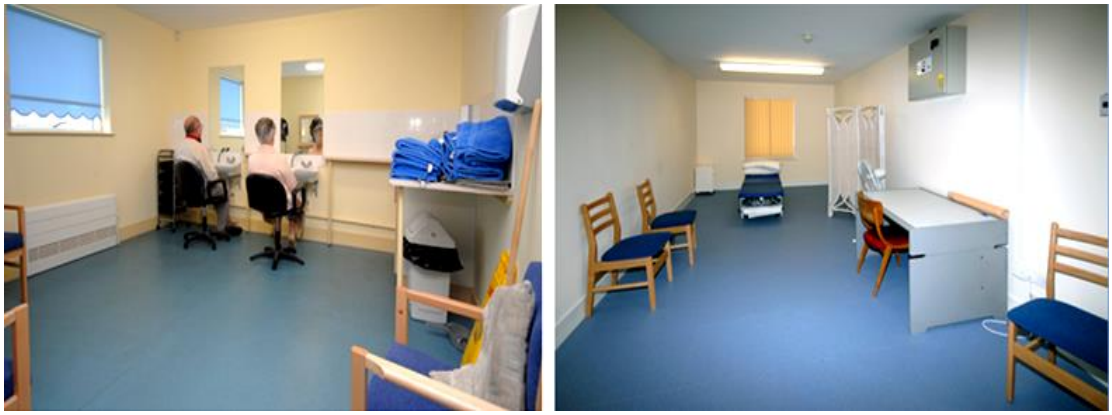


Figure 3.17: Hairdressing room (left) and reflexology room (right)
Source: Author

Figure 3.18: Buggies parked in the circulation space

Source: Author

Circulation

The scheme incorporates clear circulation routes and design features to aid orientation and way-finding (see Figure 3.19). The design ensures effective use of natural day lighting and offers views from the circulation spaces. The design of the southerly-oriented solar street helps to utilise solar gain to heat the internal spaces. The building has a heat recovery system to maximise the benefit of the heated air and to distribute it into cooler parts of the building. The solar glass foyer is ventilated by passive means, thus reducing the electricity demand from the extract fans that would otherwise be needed. Unfortunately, some parts of the circulation space lack natural light and are therefore dependent on artificial lighting. This creates a uniform visual environment, which can be confusing for some residents. It has been suggested that due to lack of natural lighting in the circulation spaces, they feel disoriented and find it difficult to readily identify which part of the building they are in. Further, there is no provision for casual seating and gathering spaces to facilitate socialising and rest.

All the circulation spaces are designed to be accessible for buggy and wheelchair use. The scheme has four staircases which are well distributed and are in appropriate locations, to minimise travel distances to the

apartments (see Figure 3.19). All the staircases are well illuminated, as they are designed with external glazing screens to maximise daylight penetration. The building has only one lift which is located next to the main reception area; however, it is not obvious on entering the building.

Figure 3.19: Circulation pattern of the scheme
Source: Author

Apartments

The scheme consists of 38 one- and two-bedroom flats. The layout is convenient for the residents (see Figure 3.20). The entrance hallways are positioned logically for easy visibility to other rooms. Individual spaces are arranged appropriately for their intended activities. Internal doors are arranged for short and simple walking distances. Consideration is also given to people with physical disabilities. All apartments provide access to external spaces and enhanced views, while retaining security for users (see Figure 3.21).

Figure 3.20: View of the kitchen (left) and bedroom (right) in a two-bedroom apartment

Source: Author

Figure 3.21: View from one of the apartments (left) and view of balcony spaces of upper floor apartments (right)

Source: Author

Architectural, Civil and Structural Requirements

The design of the building seems to be driven by a strong commitment to the delivery of an environmentally sensitive form of construction. As a traditional building material, timber is used in the framing, flooring, roofing and lining of

the construction of this exemplar scheme. The building fabric comprises a high performance, 200mm timber-framed construction with 200mm recycled cellulose insulation. The external cladding is laurohardwood, which is certified as sustainably grown. The external brick walls use hydraulic lime mortar. Throughout the entire scheme, the external openings are fitted with timber-aluminium composite windows and doors. These are glazed with low-emissivity, argon-filled double glazing. The scheme uses organic paint systems and jute based floor coverings. To reduce electricity demand from lighting, the upper floor circulation spaces are all naturally lit from light tubes.

Final Headings for the Tool

The headings from the output specification proved useful as a framework for evaluating the exemplar scheme. The overall feel of the atmosphere created both inside and out, exemplified the notion that the whole is greater than the sum of the parts. Nevertheless, the evaluation of designs requires analyses, which by its nature separate the whole into components, i.e. External Areas, Entrances, Communal Areas, Service Areas, Circulation, Apartments, and Architectural, Civil and Structural Requirements. However, the study did suggest some modifications. First, it was felt that the term *Spaces* would be preferable to *Areas.* Secondly, the detailed appearance of the scheme is really determined by *Architectural Components* rather than *Architectural, Civil and Structural Requirements.* Thirdly, it was considered that the seven headings from the output specification did not cover all the aspects were needed to form an evaluation. In particular, the context and building form had been neglected. A further study into a theoretical sequence for design evaluation was undertaken, incorporating the two additional categories. This study produced the sequence of: Context, External Space, Building Form, Entrance, Communal Spaces, Service Spaces, Circulation Spaces, Apartments, and Architectural Components, as shown in Figure 3.22.

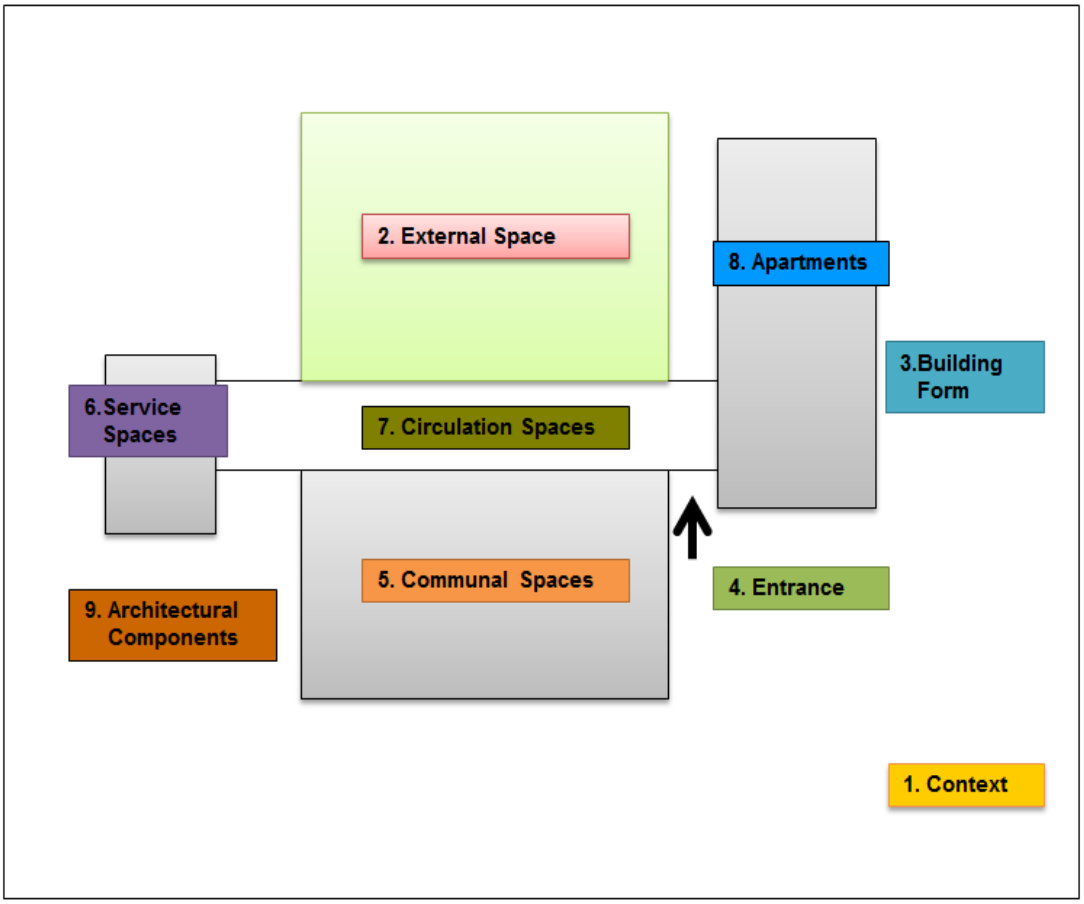


Figure 3.22: Graphical representation of theoretical sequence of the analysis of the design exemplar

Source: Author

Two additional categories were appraised for the design exemplar:

Context

The profile and roofline of the building fit in well with the surroundings. The development responds to the scale and massing of neighbouring properties and to the overall rhythm of the street scene. The design of the scheme gives consideration to a comfortable human scale as well as providing sufficient visual interest. The scheme layout makes the most of the existing landscaping features and topography. The building maximises views into and out of the site. The exemplar scheme contributes to a sense of place, community pride and identity for its users.

Building Form

The building is divided into two masses, linked by a glass foyer which is used as a communal area by the residents. The building form demonstrates a human scale, which is welcoming. It is also sympathetic to the context, sustaining a distinct local architectural language, yet maintaining an individual character. The foyer is designed as a light, glazed structure combining several functions – an entrance hall, a meeting point and internal garden that provide a visual link to both the entrance area and the main garden beyond. The overall building form is sited in such a manner that the linking solar street and day centre face south and all the apartments have an east–west orientation (see Figure 3.23). This aspect maximises solar penetration and passive gains while avoiding residences with a northerly aspect. The day centre incorporates common rooms, rest and activity areas, dining facilities (see Figure 3.23), a laundry room, a treatment room, assisted bathrooms, a training/rehabilitation kitchen, a hairdressing salon and a shop.

Figure 3.23: Southerly orientation of the entrance foyer and the day centre
Source: Author

The theoretical sequence and the appraisal of the exemplar confirmed the final headings as set out in Table 3.4.

Table 3.4: Final headings for the Tool

	Category
1.	Context
2.	External Space
3.	Building Form
4.	Entrance
5.	Communal Spaces
6.	Service Spaces
7.	Circulation Spaces
8.	Apartments
9.	Architectural Components

A brief description of each category, under its heading, is set out below:

1. *Context* – this category expresses how the building relates to its surroundings. The building should play a positive role in the neighbourhood, whether it is urban, suburban or rural. It also establishes if the design utilises its surroundings successfully. Consideration should be given to create a comfortable built environment, with a human scale, as well as sufficient visual interest. Opportunities should be maximised to utilise and celebrate any existing natural or man-made features that offer a special identity to the site.

2. *External Space* – this section deals with how the external space interacts with the building and its context. A design should clearly define the hierarchy of external spaces through volume and progression. The scheme should have a strategy for access, public and private space, ownership and security. The parking area should be functional and attractive, using techniques to articulate groups of parking bays with appropriate landscaping. The boundary treatment should create a meaningful enclosure without cutting off

views, while promoting good natural surveillance and a safe, pleasant approach to and a route past the site entrance. The way the site interacts with spaces beyond its boundaries is important in helping people feel positive about the community in which they live.

3. *Building Form* – this section explores how the scale and composition of the building form can promote a domestic environment. The building form may be enhanced by a number of elements, e.g. dormer windows, placing of the openings, solids and voids, appropriate use of material and details, chimneys, etc. The fenestration can be arranged to define the floor levels within. Variety in the materiality of the facades could be used to express different parts of the building form. The interior spaces should be apparent in the external expression of the form. The form should also define the external spaces.

4. *Entrance* – this should be well defined in its positioning and treatment. The main entrance should be well lit and distinctive, providing an inviting and welcoming place for residents, visitors and the community. The scale and appearance of the internal space immediately beyond the entrance should express domestic character. Further, the spatial arrangement of the internal space should help to create clear direction, hierarchy, and enhance security between public and private domains. The entrance area should also incorporate a variety of appropriate materials to enhance the character of the internal space.

5. *Communal Spaces* – this category shows how the provision, arrangement and location of communal spaces can maximise the enjoyment of residents and visitors. All communal spaces and their subspaces should be flexible and rationally distributed throughout the design. These spaces should be appropriately dimensioned to the scale of the building. Also all internal communal subspaces should be rationally and logically arranged. The composition and treatment of the communal spaces should provide delight and comfort. Further they also should establish clear relationships with external spaces while ensuring security.

6. *Service Spaces* – this section deals with the strategies for the building's service spaces. They should be appropriately located, sized, accessed and secured. It also establishes how the design could maximise the use of space and its adaptability, and minimise disruption to users.

7. *Circulation Spaces* Architectural, Civil and Structural Requirements – this category explores the configuration of horizontal and vertical circulation spaces. The horizontal spaces should be configured so that travel distances are minimised, the spaces are daylit, and provide casual sitting areas and views within the building and to the outside. The design of circulation spaces should be treated to aid orientation and promote a homely environment. The design needs to avoid excessive circulation space and not compromise usable space that could be incorporated into other activity areas. Accessibility for buggy and wheelchair use may be incorporated in the major spaces.

8. *Apartments* – this section is primarily about the number and layout of apartments. They should be designed and proportioned to maximise usability and future adaptations. The category also establishes the scope to personalise apartments, creating a sense of home, and relationship with the outside.

9. *Architectural Components* – this section expresses the quality of construction, materials and finishes of the proposed building. It examines how suitable design specifications are in terms of durability, operation and maintenance. It also establishes how different components could be considered with regard to specific use of space, appearance and domestic architectural language.

The overall structure of the tool is based on these identified categories developed from the sequence in which the analysis of the design exemplar was undertaken and the qualities discovered. These nine sections aim to summarise the architecture design quality of a sheltered housing scheme.

3.4 Conclusion

This purpose of this chapter was to initially analyse the existing design quality evaluation tools, to ascertain if any of them could be applied to this PFI sheltered housing project. It was concluded that although a number of useful aspects were to be found in the existing tools, none of them are really applicable to the particular circumstances. It was therefore decided that a new tool would need to be generated from first principles. The starting point was the output specification, which had been produced to set out the design requirements. However, it has limitations that include the lack of any amenity attributes and clear criteria to which the bidders could respond. Yet, it does have a structure based on building elements. Following CABE's (2005) advice, an exemplar scheme was identified to test the applicability of the headings from the output specification. It was found that although context and building form were neglected in the output specification, the other headings provided a basis for the main headings of the proposed Tool. There were minor modifications but generally the headings were fit for purpose, and this also meant that clauses from the output specification could be included by section, within the proposed Tool. The next stage was to establish sub-headings and statements, and this was achieved by reviewing guides on design quality for housing, and sheltered housing in particular, over the period 1997–2011. In the following chapter, criteria for assessment will be added to the Tool.

Chapter 4: Developing the Tool

Chapter 4: Developing the Tool

4.1 Sub-headings and Statements

Having established the overall structure of the Tool, the next stage in building the Tool was to establish sub-headings and statements, from which the criteria could be derived. Guidance on design quality has been very sporadic, mainly because of the lack of commitment from successive Governments. The culture changed completely with the Labour government (1997–2010), which pledged a radical improvement – not least in the design of housing (Carmona, 2001). In 1999, it replaced the Royal Fine Arts Commission with a better resourced, more focused adviser from CABE. Thus the starting point was to undertake a review of reports and guides on design quality for housing, and sheltered housing in particular, over the 1997–2011 period, after which CABE was effectively disbanded and the Coalition Government pulled back from design quality as a priority.

4.1.1 **Reports and Design Guides**

A review of reports and guides revealed a significant number of publications, which were organised into categories, as shown in Table 4.1.

Table 4.1: List of reports and design guides referenced in the Tool

Ageing Society and Older People Department for Communities and Local Government (2008) Department for Social Development (2011) Homes and Communities Agency (2009) Older Persons Housing Design: A European Good Practice Guide (2007)	**Lifetime Homes – Building for Life** Department for Communities and Local Government (2007) Goodman, C. (2011) Hanson, J. (2001) Housing Corporation (2008a) Joseph Rowntree Foundation (1997) Lifetime Homes (2008)
Healthcare and Extra-care BBH- Building Better Healthcare Awards (2009) Care Services Improvement Partnership (CSIP) (2008) Department of Health (2003) Housing LIN (2008a & b)	**Design Quality** CABE (Commission for Architecture and the Built Environment) (2003, 2005a, 2005b, 2005c, 2006a, 2006b, 2008, 2009a, 2009b, 2009c, 2009d) Homes and Communities Agency (2007) Housing Corporation (2007a) National Housing Federation (1998)

Table 4.1 (continued)

Accessibility and Mobility Centre for Accessible Environments and RIBA Enterprises (2004) Department of Transport (2005) Lacey, A. (2004) Thorpe, S. and Habinteg Housing Association (2006)	**Assessment Schemes** Construction Industry Council (CIC) (2003) Defence Estates (2008) Design Excellence Evaluation Process (DEEP) Evaluation Record (2008) DETR (1997) Department of Health (2008) Housing Corporation (2007b, 2008b) Lewis, A., Torrington, J., Barnes, S., Darton, R., Holder, J., McKee, K., Netten, A. and Orrell, A. (2010)
Security Association of Chief Police Officers Crime Prevention Initiatives (2004)	**Guidance by Particular Councils** Ashford City Council (2008) North Norfolk Design Guide (2008) North Tyneside Council (2006, 2007)

The publications were then analysed in terms of the headings from the overall structure.

Context

This section examines aspects significant to the setting that need to be analysed as a basis for design, and includes guidance on assessments of local development, land uses and movement patterns. According to the North Norfolk Design Guide (2008), appropriateness in terms of contextualism, should make best use of the land, provide value and create successful places. These are laudable objectives, but it may be open to interpretation as to how they might be achieved. The majority of reports and design guides highlight the importance of proposals contributing to a sense of place, community pride and civic identity (CABE, 2008; 2009a; CSIP, 2008; Defence Estates, 2008; DETR, 1997; Department of Health, 2008; Housing Corporation, 2008a and b). It is also prominent in these documents that proposals should respond to the scale and massing of the neighbourhood, and to the overall rhythm of the existing built fabric. Nevertheless, it is not just a matter of copying the surroundings and proposals should demonstrate originality in the way they have been designed (Lacey, 2004). Essentially, the key to designing a distinctive place is to first

thoroughly appreciate the overall site context (HCA, 2007; Housing LIN, 2008a and b).

New schemes should respond in a meaningful way to the local pattern of development, historical fabric and architectural heritage of the area, as this can help give a neighbourhood a strong sense of identity (CABE, 2003; CABE, 2008; CSIP, 2008; HCA, 2007) by reinforcing locally distinctive patterns of development (Lacey, 2004; North Norfolk Design Guide, 2008). Designs should take into consideration features of the immediate and distant surrounding landscape to develop a connection with the area and making the most of existing features and topography (CABE, 2005a; CABE, 2009a and c; Defence Estates, 2008; Department of Health, 2008; HCA, 2007; Housing LIN, 2008a and b; Housing Corporation, 2008a and b). The layout should be designed to integrate with the existing streets, footpaths and cycle paths, and thus offer good access to existing local facilities (Association of Chief Police Officers Crime Prevention Initiatives, 2004; CABE, 2003; 2005c; 2008).

Table 4.2 identifies the four main issues that are discussed in the guides and reports. These are sense of place, local pattern of development, local landscape and integration with the neighbourhood.

Table 4.2: Significant issues under the Context heading

Context	(CABE, 2008) (CABE, 2009a) (CSIP, 2008) (Defence Estates, 2008) (DETR, 1997) (Department of Health, 2008) (HCA, 2007) (Housing Corporation, 2008a & b) (Housing LIN, 2008a & b) (Lacey, 2004) (North Norfolk Design Guide, 2008)	**Sense of place:** The scheme contributes positively to a sense of place, increasing community pride and civic identity.
	(CABE, 2003) (CABE, 2008) (CSIP,2008) (HCA, 2007) (Housing Corporation, 2008a & b) (Lacey, 2004) (North Norfolk Design Guide, 2008)	**Local pattern of development:** The scheme responds in a meaningful way to the local pattern of development, historical fabric and architectural heritage of the area.

Table 4.2 (continued)

Context	(CABE, 2005a) (CABE, 2009a & c) (Defence Estates, 2008) (Department of Health, 2008) (HCA, 2007) (Housing LIN, 2008a & b) (Housing Corporation, 2008a & b)	**Local landscape:** The scheme utilises its surrounding landscape.
	(Association of Chief Police Officers Crime Prevention Initiatives, 2004) (CABE, 2003) (CABE, 2005c) (CABE, 2008) (Department of Health, 2008) (Housing LIN, 2008a & b) (Housing Corporation, 2008a & b) (Lacey, 2004)	**Integration with the neighbourhood:** The site is well integrated with the existing roads, footpaths and cycle paths etc. providing good access to existing local facilities, including shops etc.

These four issues provide the sub-headings to context and the issues identified, and form the basis for the statement under each sub-heading.

External Space

This section deals with how external space interacts with the proposed building and its context. External space allows elderly people to communicate with the outside world from a protected and calm environment. The need is to design serene, flexible but also potentially lively spaces that residents can enjoy in many different ways and where they are independent but safe (Older Persons Housing Design: European good practice guide, 2007; North Tyneside Council, 2007; North Norfolk Design Guide, 2008; Thorpe and Habinteg Housing Association, 2006).

As discussed in several of the reports and design guides, the way that buildings are grouped and relate to each other is one of the most dominant influences on how users interact with the built environment. Therefore consideration should be given to integrate pleasant, attractive and landscaped spaces as an intrinsic element of the design (CAE and RIBA, 2004; Defence Estates, 2008) (see Figure 4.1 as an example).

Figure 4.1: Open external space extending into the surroundings
Source:http://www.boora.com/index.php/projects/custom-homes/360_beach_house)

Further, external spaces should be designed to accommodate different functions, e.g. providing stimulating views from within the building and extending the building into the immediate surroundings. This would also help to put the majority of external spaces under natural surveillance, promoting personal safety and security (HCA, 2007; 2009; Housing LIN, 2008a and b; Housing Corporation, 2008a and b; Lacey, 2004). The surrounding landscaping should be designed with the special needs of the residents in mind. Communal gardens for the shared use of residents and the wider community should be provided alongside private gardens and patios (CABE, 2009a, b and c; DETR, 1997).

The external areas should be designed to provide protected, sunny, sheltered outdoor seating spaces. Consideration should also be given to incorporating greenhouses, potting sheds and other outdoor activity spaces. Raised beds are vital to allow residents to participate in gardening activities. The external spaces, including planting, should consider easy maintenance and include vibrant colours and scents to stimulate the senses (BBH, 2009;

CABE, 2003; 2008; Department of Health, 2008). A range of reports and guides also discuss the importance of lighting when designing an external environment for the elderly. Lighting should be considered to illuminate pathways and features within the garden, to create different atmospheres and permit the space to be enjoyed both day and night (Association of Chief Police Officers Crime Prevention Initiatives, 2004; Lewis et al., 2010).

The external space should offer adequate parking for residents and visitors, with an appropriate provision for disabled people (CAE and RIBA, 2004; CABE, 2005a and c). The position of the parking spaces for disabled people should be located in an area immediately surrounding the building. The site design should provide for safe, simple and comfortable access to the building for people on foot, in wheelchairs and on scooters (Thorpe and Habinteg Housing Association, 2006). There should be safe pedestrian routes within the car park and they should all be level or have shallow gradients (Goodman, 2011; US Department of Justice, 1994; Older Persons Housing Design: European good practice guide, 2007; North Tyneside Council, 2007).

The third issue highlighted under the external space heading is the property boundaries, particularly those at the side and rear adjoining public land, as these need to be secure. Most of the reports and guides discuss the importance of making the site safe and secure for its users (Association of Chief Police Officers Crime Prevention Initiatives, 2004; Department of Health, 2008; Housing LIN, 2008a; Housing Corporation, 2008a and b; Lacey, 2004). Overlooking external communal spaces is desirable as it helps natural surveillance. Hence it is significant to design a boundary which is appropriate in scale, material and that promotes security. However, consideration should be given to the design of the walls, fences, metal railings and gates used to define external spaces as these elements have major impact on the visual character of the development. These should be carefully selected with local distinctiveness in mind and should be an integral part of the overall design concept. Thus the three most important issues identified under the External Spaces heading are landscaping, parking and boundary treatment. Table 4.3 summarises the identified issues.

Table 4.3: Significant issues under the External Spaces heading

External Spaces	(Association of Chief Police Officers Crime Prevention Initiatives, 2004) (BBH, 2009) (CABE, 2003) (CABE, 2008) (CABE, 2009a,b & c) (CAE and RIBA, 2004) (Defence Estates, 2008) (DETR, 1997) (Department of Health, 2008) (HCA, 2007; 2009) (Housing LIN, 2008a & b) (Housing Corporation, 2008a & b) (Lacey, 2004) (Lewis et al., 2010) (Older Persons Housing Design: European good practice guide, 2007) (North Tyneside Council, 2007) (North Norfolk Design Guide, 2008) (Thorpe and Habinteg Housing Association, 2006)	**Landscaping:** The land-scaping/gardens are successfully integrated with the building, and public and private external spaces can be naturally surveyed, promoting personal safety and security.
	(Association of Chief Police Officers Crime Prevention Initiatives, 2004) (CAE and RIBA, 2004) (CABE, 2005a & c) (CABE, 2008) (Goodman, 2011) (Department of Health, 2008) (HCA, 2009) (Housing LIN, 2008a & b) (Lacey, 2004) (Older Persons Housing Design: European good practice guide, 2007) (North Tyneside Council, 2007) (Thorpe and Habinteg Housing Association, 2006) (US Department of Justice, 1994)	**Parking:** There is adequate parking for residents and visitors, with an appropriate provision for disabled people.
	(Association of Chief Police Officers Crime Prevention Initiatives, 2004) (CABE, 2003) (CABE, 2008) (CSIP, 2008) (Department of Health, 2008) (Housing LIN, 2008a) (Housing Corporation, 2008a & b) (Lacey, 2004) (North Tyneside Council, 2007) (North Norfolk Design Guide, 2008)	**Boundary treatment:** The boundary treatments are appropriate in scale and promote security.

Building Form

This section deals with the scale and composition of the building form to promote a domestic environment. It highlights the significance of clear

relationships between the site, building form and external spaces (CAE and RIBA, 2004; Housing Corporation, 2008a).

The building form should have human scale and feel welcoming (CABE, 2005a; 2008; Housing LIN, 2008a and b). The form can be punctuated by a number of aspects, e.g. placing of the openings, the solids and voids created, appropriate use of material and detail. It is preferable to ensure that ridge heights and overall proportions of the development are compatible with surrounding buildings. The design should demonstrate an apparent visual break between the main building and the secondary elements. This could be best achieved through changes in roofline and pitch and by stepping the main elevation forwards or backwards (North Norfolk Design Guide, 2008; Housing Corporation, 2008a). As scale is not just about the size of the building but the way certain features express the apparent size, windows, floor to floor heights and, in particular, entrances all contribute considerably to the perceived sense of the scale of a building (CABE, 2005a; Lacey, 2004; Department of Health, 2008) (see Figure 4.2).

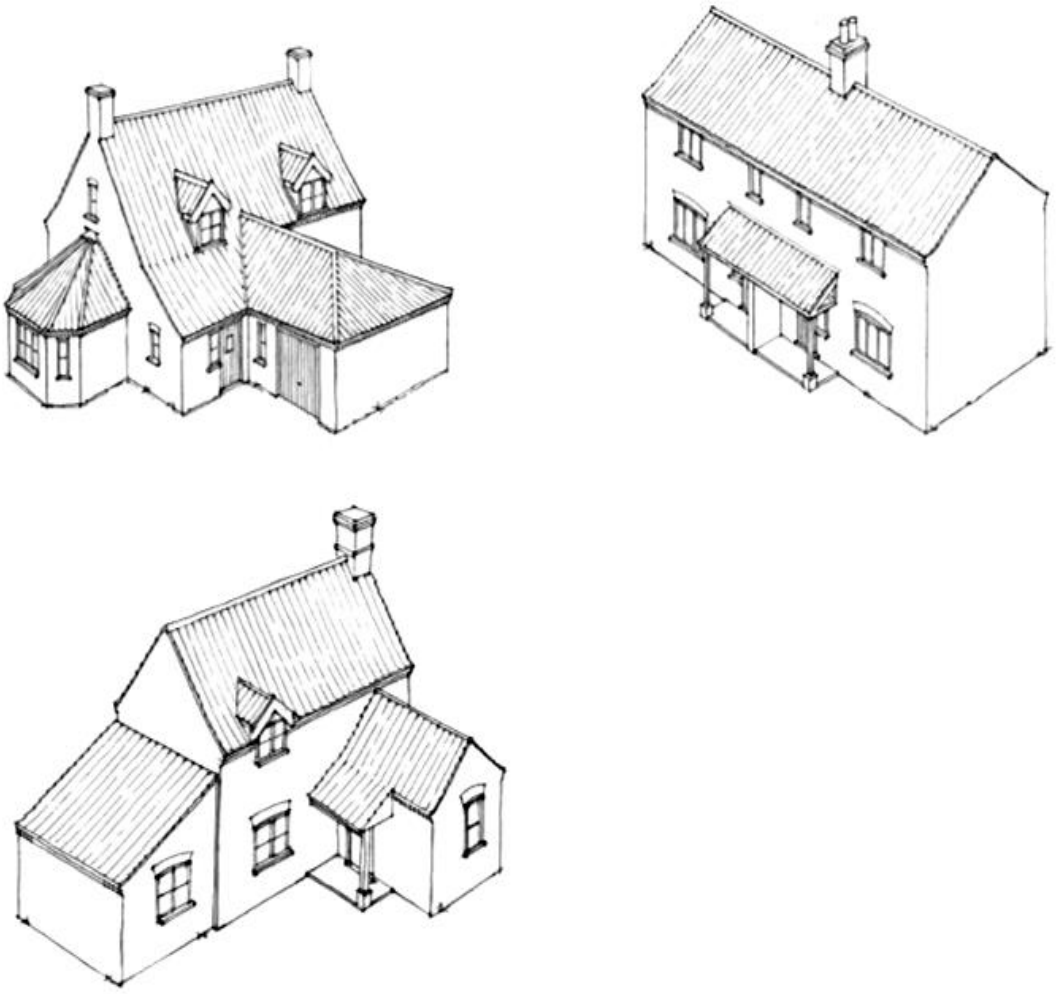


Figure 4.2: Illustrations of how forms can produce a domestic scale
Source: North Norfolk Design Guide, 2008

The elevations should be the result of decisions on colour, material, texture and patterns. Facades that are subdivided into a number of elements can help to emphasise the domestic scale. Windows need to be arranged to suit the facades but also to provide views and light for inside the building. The aim should be to create buildings which relate well to their site and are clearly rooted in the surroundings (North Norfolk Design Guide, 2008). The elevation colours and textures should also be chosen to relate positively to adjacent buildings. Particular care should be given to corners, roof lines and how the building meets the ground, as all these aspects have a significant effect on the overall impression of a building (Defence Estates, 2008; Department of Health, 2008). In addition, it is established in various reports

and guides that the building should be clearly understandable from the exterior and reflect the various internal spaces. The relationship of internal and external space should offer suitable connections between the levels of the building and garden (CABE, 2003, 2008; HCA, 2009; Housing LIN, 2008a and b). Different parts of the building should have different characters in order to allow for easy way-finding (Lacey, 2004; Defence Estates, 2008). The building elements should provide variety yet maintain a coherent language. The form can contribute to positive external space and be site specific (CABE, 2008; HCA, 2009). Buildings should be grouped to create external spaces which are well defined and have a clear purpose and function, as it is the way these spaces are sequenced which can generate surprise and variety, to create a visual interest (Housing Corporation, 2008a and b). The surrounding spaces of the building need to be pleasing and safe because well designed, attractive and maintained external spaces can be a source of pride for the residents (CABE, 2003; Defence Estates, 2008; Housing LIN, 2008a and b; Older Persons Housing Design: European good practice guide, 2007). Therefore a review of issues under the Building Form heading has highlighted the key issues shown in Table 4.4.

Table 4.4: Significant issues under the Building Form heading

Building Form	(CABE, 2005a) (CABE, 2008) (CAE and RIBA, 2004) (Housing Corporation, 2008a) (Department of Health, 2008) (Lacey, 2004) (North Norfolk Design Guide, 2008)	**Building scale:** The building has a human scale and feels welcoming.
	(Defence Estates, 2008) (Department of Health, 2008) (North Norfolk Design Guide, 2008)	**Elevations:** The elevations are thoughtfully considered with particular attention given to colour, material, texture and patterns.
	(CABE, 2003) (CABE, 2008) (Department of Health, 2008) (HCA, 2009) (Housing LIN, 2008a & b) (Lacey, 2004)	**Definition:** The building is clearly understandable and defined from the exterior and reflects the various internal uses.

Table 4.4 (continued)

Building Form	(Defence Estates, 2008) (Department of Health, 2008) (Housing LIN, 2008a & b) (North Norfolk Design Guide, 2008)	**Variety:** The building elements provide variety yet maintain a coherent language.
	(CABE, 2003) (CABE, 2008) (Defence Estates, 2008) (HCA, 2009) (Housing LIN, 2008a & b) (Housing Corporation, 2008a & b) (Older Persons Housing Design: European good practice guide, 2007)	**External spaces:** The building form has contributed to positive external space and is specific to the site.

Entrances

These should be clear and logically positioned in relation to the anticipated points of arrival into site (CAE and RIBA, 2004; Defence Estates, 2008). The form of the building should invite an approach to the places where the public enter, without the need for signs. The building layout may enable the main entrance to be legible from all approaches to the building (North Norfolk Design Guide, 2008). Further care should be taken to provide key storage spaces near the building entrance, such as buggy and cycle storage. However, storage must not detract from a welcoming, pleasant and non-institutional way into the building (Housing LIN, 2008a and b; Department of Health, 2008; Goodman, 2011). The entrance should be clearly defined and sheltered (CAE and RIBA, 2004; Housing LIN, 2008a and b; Lacey, 2004). External canopies over entrances could be considered as protection from bad weather and to clearly mark the entrance (Defence Estates, 2008). Controlled access system operable from residents' apartments and monitored by the warden may be used to ensure security of residents (Department of Transport, 2005; Department of Health, 2008). The proposed building should provide for a reception area that promotes a relaxed and open feel. The reception lobby area can be accessible to the public with a seating area near the entrance to enable the residents to wait comfortably and enjoy the external views. The whole scheme, including entrances, must

be designed to wheelchair-user standards (North Norfolk Design Guide, 2008; Thorpe and Habinteg Housing Association, 2006).

The building entrance should encourage a good level of natural surveillance both day and night and avoid any areas where people could hide (CIC, 2003). This can be achieved through the configuration of the layout and the position of windows (Housing LIN, 2008a and b; Lacey, 2004), ensuring that external spaces can be viewed from the interior (Defence Estates, 2008). It is emphasised that the entrance should have an appropriate internal character that is in keeping with its domestic nature (BBH, 2009; Department of Health, 2003; Defence Estates, 2008; Department of Health, 2008). The entrance should have level access, opening into a spacious foyer that could provide a transition space from outside to inside, and should help orientate users once inside the building (Housing LIN, 2008a and b; Lacey, 2004; North Tyneside Council, 2007). A well-lit but small sitting area at the main entrance for residents could add to a welcoming entrance (CABE, 2005a; Older Persons Housing Design: European good practice guide, 2007) (see Figure 4.3).

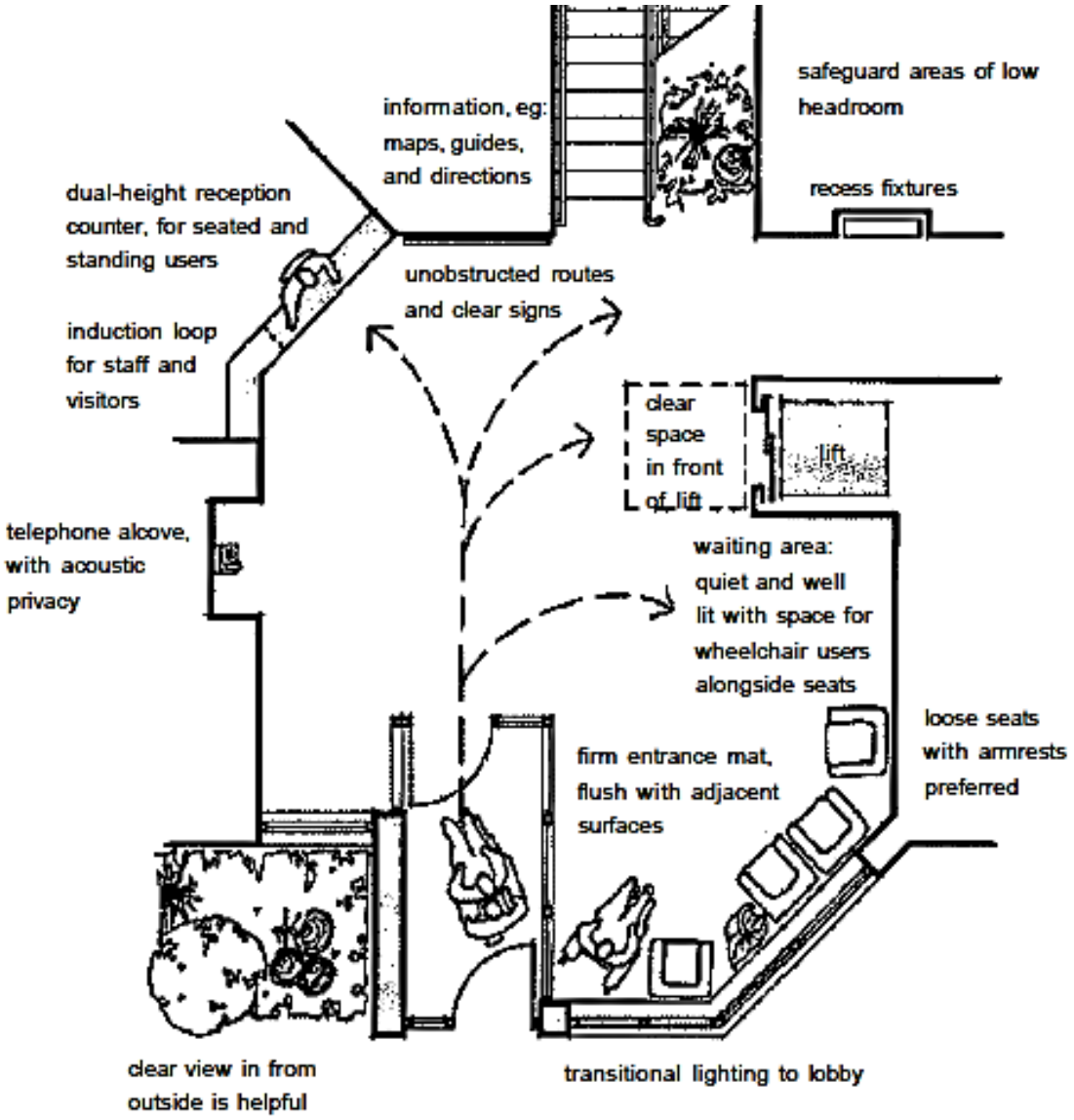


Figure 4.3: Clearly identifiable entrance layout

Source: Centre for Accessible Environments and RIBA Enterprises, 2004

A clear hierarchy of spaces needs to be apparent from the main entrance to individual apartments, i.e. public, semi-public, semi-private and private spaces (North Tyneside Council, 2007; Older Persons Housing Design: European good practice guide, 2007; CABE, 2008; HCA, 2009). There should be a clear demarcation between public and private areas for privacy and safety of the residents. Not only may a clear separation between areas just for residents, warden and visitors be evident, but a distinction between shared spaces for residents and those for the wider community is also important (Housing LIN, 2008a and b; Lacey, 2004). Other entrances and

exits should have clear hierarchy and distinctive purpose. The use of colour or themes could be an important tool for assisting with way-finding and different types of entrance. Service spaces, e.g. the boiler room and refuse store, are preferably accessed from the car park without impinging on the main entrance or garden areas (Association of Chief Police Officers Crime Prevention Initiatives, 2004; Goodman, 2011). Table 4.5 identifies the sub-headings and statements in relation to entrances.

Table 4.5: Significant issues under the Entrances heading

Entrances	(CAE and RIBA, 2004) (Defence Estates, 2008) (Department of Health, 2008) (Goodman, 2011) (HCA, 2009) (Housing LIN, 2008a & b) (Lacey, 2004) (Lewis et al., 2010) (North Norfolk Design Guide, 2008) (Older Persons Housing Design: European good practice guide, 2007)	**Positioning:** Entrances are clear and logically positioned in relation to the anticipated points of arrival on site.
	(CAE and RIBA, 2004) (Defence Estates, 2008) (Department of Health, 2008) (Department of Transport, 2005) (Housing LIN, 2008a & b) (Lacey, 2004) (North Norfolk Design Guide, 2008) (North Tyneside Council, 2007) (Thorpe and Habinteg Housing Association, 2006)	**Definition & Shelter:** The entrance is clearly defined and sheltered. Due consideration given to prevailing winds, surrounding buildings, landscaping and amenities.
	(CIC, 2003) (Defence Estates, 2008) (Housing LIN, 2008a & b) (Lacey, 2004) (North Tyneside Council, 2007) (Thorpe and Habinteg Housing Association, 2006)	**Surveillance:** The entrance encourages a good level of natural surveillance both day and night.
	(BBH, 2009) (CABE, 2005a) (Department of Health, 2003) (Defence Estates, 2008) (Department of Health, 2008) (Housing LIN, 2008a & b) (Lacey, 2004) (North Tyneside Council, 2007) (Older Persons Housing Design: European good practice guide, 2007)	**Internal Character:** The entrance has an appropriate internal character that is in keeping with the building purpose.

Table 4.5 (continued)

Entrances	(Association of Chief Police Officers Crime Prevention Initiatives, 2004) (CABE, 2005c) (CABE, 2008) (Defence Estates, 2008) (HCA, 2009) (Housing LIN, 2008a & b) (Lacey, 2004) (North Tyneside Council, 2007) (Older Persons Housing Design: European good practice guide, 2007)	**Hierarchy of spaces:** A clear hierarchy of spaces are designed for the users from the main entrance to individual apartments (i.e. public, semi-public, semi-private and private spaces).
	(Association of Chief Police Officers Crime Prevention Initiatives, 2004) (CABE, 2008) (Goodman, 2011) (North Tyneside Council, 2007) (US Department of Justice, 1994)	**Other Entrances:** Other entrances and exits have clear hierarchy and distinctive purpose.

Communal Spaces

This part of the Tool deals with how successfully the provision, arrangement and location of the communal spaces could be provided to maximise the enjoyment of residents and visitors. It discusses the communal spaces composition and treatment to provide comfort and delight. It also examines how communal spaces could establish clear relationships with external spaces while ensuring security.

Communal spaces should be rationally and logically arranged within the building to minimise avoidable long journeys for the users. All communal facilities should be located within a core area and could function like a street where people meet and interact with each other. Generally the main communal area should be located near to or at least be clearly visible from the main entrance (Association of Chief Police Officers Crime Prevention Initiatives, 2004; CABE, 2009a, b and c; CIC, 2003). Alcoves and niches could be designed in the main communal space to permit smaller groups to gather together. The communal space may allow views and direct access onto a south-facing external space and garden (see Figure 4.4).

Figure 4.4: Significant issues under the Entrances heading
Source: http://southsidehappenings.blogspot.co.uk/2011_04_01_archive.html)

There should also be small lounges within the accommodation, located in a semi-private space, accessible only to the residents for private parties with relatives, small gatherings, specific activities etc. (Department of Transport, 2005; HCA, 2009; Housing Corporation, 2007a; Housing Corporation, 2008a and b; Housing LIN, 2008a and b; Older Persons Housing Design: European good practice guide, 2007). Lounges can be designed to be flexible and should be rationally distributed throughout the building, and appropriately dimensioned to the scale of the building (CABE, 2005a; 2008). Many residents like small communal spaces. However these spaces should be easily accessible and not located at the ends of corridors or isolated from the main circulation network (CABE, 2009a, b and c; CIC, 2003; Hanson, 2001; Lewis et al., 2010; Lacey, 2004).

A successful strategy may integrate shops, services and public amenities, as previous research provides evidence that engagement with a wider community has a positive effect on the quality of life for older people (North Tyneside Council, 2007; HCA, 2007, 2009; Housing LIN, 2008a). The proposals could have provision for a restaurant, community centre, hobby

room, café, shop, hairdresser, library with internet access, gym, swimming pool, and so on, that might be used by the wider community, promoting community integration (CAE and RIBA, 2004; Defence Estates, 2008).The internal volumes of the communal spaces should be coherent and consistent with the external form of the building (CABE, 2005a; CIC, 2003). Where appropriate, communal spaces should provide views within the building. The use of clear glazed screens can improve the feeling of space within the building and enables good visual access throughout. Floor to ceiling glazing could be introduced where it is safe to do so in order to create an open, contemporary feel (Older Persons Housing Design: European good practice guide, 2007). The issues are summarised in Table 4.6.

Table 4.6: Major issues identified under the Communal Spaces heading

Communal Spaces	(Association of Chief Police Officers Crime Prevention Initiatives, 2004) (CABE, 2009a, b & c) (CIC, 2003) (Department of Transport, 2005) (Defence Estates, 2008) (Department of Health, 2008) (HCA, 2009) (Housing Corporation, 2007a) (Housing Corporation, 2008a & b) (Housing LIN, 2008a & b) (North Tyneside Council, 2007) (Older Persons Housing Design: European good practice guide, 2007) (US Department of Justice, 1994)	**Arrangement:** Communal spaces are rationally and logically arranged within the building and minimise unnecessary long journeys for the users.
	(Defence Estates, 2008) (CABE, 2005a) (CABE, 2008) (CABE, 2009a, b & c) (CIC, 2003) (CSIP, 2008) (Department of Health, 2008) (Hanson, 2001) (Lewis et al., 2010) (Housing Corporation, 2007a) (Housing LIN, 2008a & b) (Lacey, 2004) (Older Persons Housing Design: European good practice guide, 2007)	**Communal Lounges and Subspaces:** Lounges are flexible and are rationally distributed throughout the building and are appropriately dimensioned to the scale of the building. Also, all internal communal subspaces are rationally and logically arranged.

Table 4.6 (continued)

Communal Spaces	(CABE, 2009b & c) (CIC, 2003) (Defence Estates, 2008) (Department of Health, 2008) (HCA, 2009) (Housing LIN, 2008a & b)	**Composition:** Communal spaces are composed to promote excitement, delight and comfort.
	(CABE, 2009a, b & c) (CAE and RIBA, 2004) (Defence Estates, 2008) (Lacey, 2004) (North Tyneside Council, 2007) (HCA, 2007, 2009) (Housing LIN, 2008a) (Older Persons Housing Design: European good practice guide, 2007)	**Amenities:** Successful strategies for integrating shops, services and public amenities have been put in place.
	(CABE, 2005a) (CIC, 2003) (Housing LIN, 2008a)	**Volume:** The internal volumes of the communal spaces are coherent and consistent with the external form of the building.
	(Department of Health, 2008) (Older Persons Housing Design: European good practice guide, 2007)	**Internal Connections:** When appropriate, the communal spaces provide views within the building.

Service Spaces

This section offers strategies for the building's service spaces. It identifies how they could be appropriately located, sized, accessed and secured. It also establishes how the design could be considered to maximise use of space and adaptability, and minimise disruption to users.

Communal Laundry

The laundry should be suitably sized, located to minimise users' travel distances and have a direct connection to an outside drying area (Association of Chief Police Officers Crime Prevention Initiatives, 2004; Department of Transport, 2005; Housing LIN, 2008a and b). It should have special features for older people including: raised plinths, and controls that are easy to see and use, on the front of the machines (North Tyneside Council, 2007; Thorpe and Habinteg Housing Association, 2006).

Buggy Store

The buggy store should be safe, well located and suitably sized (Thorpe and Habinteg Housing Association, 2006). It should be ideally positioned

adjacent to the main entrance. The internal space must be well laid and marked out, for convenience. It should also have charging facilities and (Housing LIN, 2008a and b) and the doors should be fob controlled (Housing Corporation, 2008a and b).

Refuse Stores

All internal refuse stores should be well located to minimise users' travel distances. The refuse strategy should segregate waste disposal routes from social and communal areas to minimise disturbance to residents and visitors (Housing Corporation, 2008a and b; Department of Health, 2008).

Plant Room and Service Ducts

These should also be located so as to cause minimum disturbance to residents, visitors and neighbours; yet be accessible for maintenance.

Ancillary Storage

Cleaners' stores should also be located to cause minimum disturbance to residents and visitors, while being convenient for use (Lacey, 2004; Housing LIN, 2008a). One cleaner's storage should be provided on each floor and include sink, space for cleaning equipment, vacuum cleaners, and trolleys. Table 4.7 summarises the issues with regard to service spaces.

Table 4.7: Principal issues regarding Service Spaces

Service Spaces	(Association of Chief Police Officers Crime Prevention Initiatives, 2004) (Department of Transport, 2005) (Housing Corporation, 2008a & b) (Housing LIN, 2008a & b) (North Tyneside Council, 2007) (Thorpe and Habinteg Housing Association, 2006)	**Laundry:** Laundry areas are well located, suitably sized, minimise users' travel distances and have a logical connection to an outside drying area.
	(Housing Corporation, 2008a & b) (Housing LIN, 2008a & b) (North Tyneside Council, 2007) (Thorpe and Habinteg Housing Association, 2006)	**Buggy Stores:** Buggy stores are secure, well located and suitably sized.

Table 4.7 (continued)

Service Spaces	(Defence Estates, 2008) (Department of Health, 2008)(Department of Transport, 2005) (Housing LIN, 2008a & b) (North Tyneside Council, 2007)	**Bin Stores:** Internal refuse stores are well located, suitably sized, minimise users' travel distances.
	(Department of Health, 2008) (Housing Corporation, 2008a & b) (Housing LIN, 2008a) (North Tyneside Council, 2007)	**Refuse Strategy:** The refuse strategy segregates waste disposal routes from social and communal areas and minimises disturbance to residents and neighbours.
	(Housing LIN, 2008a) (North Tyneside Council, 2007)	**Plant room and service ducts:** Plant rooms and service ducts are located in a logical location and do not cause disturbance to residents, users and neighbours.
	(Defence Estates, 2008) (Department of Health, 2008) (Housing LIN, 2008a) (Lacey, 2004) (North Tyneside Council, 2007) (Thorpe and Habinteg Housing Association, 2006)	**Ancillary Storage:** Ancillary storage, i.e. cleaners' stores, are well located, suitably sized and distributed to cause minimum disturbance to residents and users.

Circulation Spaces

This category deals with the configuration of horizontal circulation and the appropriate location of lifts and stairs. It discusses how the design of circulation spaces should be treated to assist orientation and promote a homely environment. It also establishes how the use of these spaces can be maximised (HCA, 2009; Housing LIN, 2008a and b). The horizontal circulation spaces should be configured in a way that minimises travel distances (Thorpe and Habinteg Housing Association, 2006). Circulation spaces should be designed to be light, airy and spacious with interesting changes of aspect (see Figure 4.5). The circulation routes can provide casual sitting spaces and views within the building and to the exterior, and should avoid an institutional appearance often derived from the notion of corridors. It would be advantageous for main circulation routes to overlook the garden, to assist orientation, and to provide an interesting outlook. The building layout should help to create and define useful external spaces that

relate to the internal layout of the building (CAE and RIBA, 2004; Defence Estates, 2008; US Department of Justice, 1994; Lacey, 2004; Older Persons Housing Design: European good practice guide, 2007).

Figure 4.5: Circulation space
Source: http://www.ownersdirect.co.uk/portugal/P6341.htm

The lifts should be distributed to minimise travel distances to apartments (Department of Transport, 2005). The location of staircases should also have this objective, and enable residents to engage with the spaces around them (CABE, 2009a and d; Department of Health, 2008). Preferably one staircase should be provided near to the main entrance and staircase design must consider the older people's needs, such as the rake, height of risers, number of treads between landings and slip resistant coverings (Lifetime Homes, 2008). Table 4.8 summarises the issues in relation to circulation spaces.

Table 4.8: Key issues for Circulation Spaces

Circulation Spaces	(CABE, 2009a & d) (CAE and RIBA, 2004) (Defence Estates, 2008) (Department of Health, 2008) (Department of Transport, 2005) (HCA, 2009) (Housing LIN, 2008a & b) (Lacey, 2004) (North Tyneside Council, 2007) (Older Persons Housing Design: European good practice guide, 2007) (Thorpe and Habinteg Housing Association, 2006) (US Department of Justice, 1994)	**Corridors:** The internal spaces are configured so that corridor lengths are minimised (avoid corridor aesthetic), good daylight penetration/solar gain, provide casual sitting spaces and views within the building and to exterior
	(CAE and RIBA, 2004) (Housing Corporation, 2008a & b) (Housing LIN, 2008a & b) (Lacey, 2004) (North Tyneside Council, 2007) (Older Persons Housing Design: European good practice guide, 2007) (Thorpe and Habinteg Housing Association, 2006)	**Lifts:** Lifts are well distributed and in appropriate locations to minimise travel distances to apartments
	(CAE and RIBA, 2004) (Goodman, 2011) (Housing LIN, 2008a & b) (Lacey, 2004) (North Tyneside Council, 2007) (Older Persons Housing Design: European good practice guide, 2007) (Thorpe and Habinteg Housing Association, 2006)	**Staircases:** Staircases are well distributed and in appropriate locations, minimise travel distances to apartments, and where possible engage with areas around them

Apartments

The number and layout of apartments has considerable impact on comfort and enjoyment for residents. This section explores how they are designed and proportioned to maximise usability and future adaptations. It also examines the scope to personalise, creating a sense of home and the success of external connectivity. The design should optimise the number of appropriate sized apartments on the site with a consideration to a good ratio of one- to two-bed apartments (Housing LIN, 2008a and b). All of the apartment layouts should be simple, efficient and avoid unnecessary complexities in their planning. The apartments should provide a clear hierarchy and progression through the spaces. Thresholds and hallways should be suitable for mobility aid users and sufficient turning space for a

wheelchair should be provided in every room in each apartment (Thorpe and Habinteg Housing Association, 2006).

The possibility for future adaptability through the incorporation of a flexible layout extends the longevity of proposals. The overriding objective is that people can live in their own apartments designed to meet their needs. These should be oriented and configured to maximise daylight, enhance views and allow access to private external spaces (see Figure 4.6).

Figure 4.6: Window provided to enhance internal spaces
Source: http://www.dezeen.com/2013/12/05/concrete-house-stream-india-architecture-brio/

The apartments should also be arranged to maximise acoustic comfort and resist the passage of noise and unwanted sounds (HCA, 2009; Housing Corporation, 2008a and b). Moreover, there should be adequate provision for storage. Cupboards need to be large enough to store items such as ironing boards, vacuum cleaners etc. (Thorpe and Habinteg Housing Association, 2006). It is emphasised in several reports and guides that the entrance to each apartment should be attractive, welcoming and could be personalised to the resident's taste (CABE, 2006a and b, 2009d; HCA, 2009; Housing LIN,

2008a and b). Ideally, the front door should be recessed from the circulation space to provide a shelf or small place to personalise the entrance (Association of Chief Police Officers Crime Prevention Initiatives, 2004; Older Persons Housing Design: European good practice guide, 2007). There could be a glass panel beside each front door or optical devices in the door, to verify visitors. Table 4.9 identifies the issues with respect to apartments.

Table 4.9: Issues discussed under the Apartments heading

Apartments	(Housing LIN, 2008a) (North Tyneside Council, 2007) (CABE, 2009a & d)	**Number of Apartments:** The design has reasonably maximised the number of appropriate sized apartments on site with a consideration to the proper ratio of 1- to 2-bed apartments.
	(CABE, 2009a & d) (CSIP, 2008) (Defence Estates, 2008) (Department of Health, 2003) (DETR,1997) (Goodman, 2011) (Housing Corporation, 2008a & b) (Housing LIN, 2008a & b) (Lacey, 2004) (Lewis et al., 2010) (Thorpe and Habinteg Housing Association, 2006)	**Layouts:** The apartment layouts are simple, efficient and avoid unnecessary complexities in their planning.
	(CABE, 2006a & b) (CABE, 2009d) (Department of Transport, 2005) (DETR,1997)(Goodman, 2011) (HCA, 2009) (Housing Corporation, 2008a & b) (Housing LIN, 2008a & b) (Lewis et al., 2010) (North Tyneside Council, 2007) (Thorpe and Habinteg Housing Association, 2006) (US Department of Justice, 1994)	**Use of Space:** The apartments have a clear hierarchy and the progression through spaces is rationally and logically considered.
	(CABE, 2005a, 2008, 2009a & d) (CSIP, 2008) (Defence Estates, 2008) (Goodman, 2011) (Housing Corporation, 2008a & b) (Housing LIN, 2008a)	**Adaptability:** The apartments provide the possibility for future adaptability and maintain a flexible layout.

Table 4.9 (continued)

Apartments	(Association of Chief Police Officers Crime Prevention Initiatives, 2004) (CABE, 2009d) (DETR,1997) (HCA, 2009) (Housing LIN, 2008a) (North Norfolk Design Guide, 2008)	**Daylighting:** The apartments are oriented and configured to maximise daylight, enhance views and where possible allow access to (private) external spaces.
	(Defence Estates, 2008) (Department of Health, 2003) (DETR,1997) (Housing LIN, 2008a & b)	**Acoustics:** The apartments are arranged to maximise acoustic comfort and resist the passage of noise and unwanted sounds.
	(CABE, 2009d) (Defence Estates, 2008) (Housing Corporation, 2007a, 2008a & b) (Housing LIN, 2008a & b) (Lacey, 2004) (North Tyneside Council, 2007) (Thorpe and Habinteg Housing Association, 2006)	**Storage:** Storage is in appropriate locations and of adequate provision.
	(Association of Chief Police Officers Crime Prevention Initiatives, 2004) (CABE, 2009a & d) (Defence Estates, 2008) (HCA, 2009) (Housing LIN, 2008a & b) (Older Persons Housing Design: European good practice guide, 2007)	**Apartment Entrance:** The entrance to each apartment is attractive, welcoming and can be personalised to the resident's taste.

Architectural Components

This category investigates the quality of structure, materials and finishes of the building elements. It explores suitable design specifications in terms of durability, operation and maintenance. It also establishes how different components should be considered with regard to specific use of space, appearance and domestic qualities. It is recognised that the building envelope, doors and windows, internal walls and finishes, lifts, staircase, fixtures, fittings and equipment, external works and lighting are especially significant in designing for older people.

This section shows how the building envelope, i.e. external walls and roof including canopies, can be designed for durability, maintenance and aesthetic quality. It also reviews how the quality, style and appearance of doors and windows are vital to enhance the domestic nature of designs. Further, it is mentioned in several of the reports and design guides that the

internal walls, ceilings and partitions should also be of appropriate style and appearance. The internal finishes to walls and floors, including staircase floors and ceilings, also contribute to the overall design quality. In addition, lifts and staircases should incorporate appropriate materials and detailing. Sanitary ware, kitchen fittings and electrical installations can be designed to be user-friendly, durable and finished to enhance usability. Finally the external works including the external lighting should be attractive and functional for its users (CABE, 2008; Housing Corporation, 2008a and b; Housing LIN, 2008a). Table 4.10 highlights the key issues identified under this heading.

Table 4.10: Key issues under the Architectural Components heading

Architectural Components	(CABE, 2008) (Defence Estates, 2008) (Department of Health, 2008) (North Tyneside Council, 2007)	**Building Envelope:** The building structure (frame and upper floors) and the building envelope (external walls and roof including canopies) are appropriately designed for durability, maintenance and aesthetics.
	(Association of Chief Police Officers Crime Prevention Initiatives, 2004) (Defence Estates, 2008) (Goodman, 2011) (Housing LIN, 2008a) (North Tyneside Council, 2007) (Thorpe and Habinteg Housing Association, 2006)	**External Doors and Windows:** External doors and windows are of appropriate quality, style and appearance.
	(Association of Chief Police Officers Crime Prevention Initiatives, 2004) (Housing LIN, 2008a) (Lewis et al., 2010) (North Tyneside Council, 2007) (Thorpe and Habinteg Housing Association, 2006)	**Internal Doors:** Internal doors are of appropriate quality, style and appearance.
	(Defence Estates, 2008) (Goodman, 2011) (North Tyneside Council, 2007)	**Internal Walls:** Internal walls, ceilings and partitions (including internal glazed screens) are of appropriate quality, style and appearance.
	(Defence Estates, 2008) (Housing LIN, 2008a) (North Tyneside Council, 2007)	**Internal Finishes:** Internal finishes to walls, floors (including staircase floors) and ceilings are of appropriate quality, style and appearance. **Note:** this sub-section applies to all internal spaces.

Table 4.10 (continued)

Architectural Components	(Goodman, 2011) (Housing Corporation, 2008a & b) (Housing LIN, 2008a) (North Tyneside Council, 2007)	**Lifts:** Lifts have an appropriate internal finish.
	(North Tyneside Council, 2007)	**Staircases:** Staircases have appropriate materials, detailing and appearance.
	(Housing Corporation, 2007a) (Housing LIN, 2008a) (North Tyneside Council, 2007)	**Fixtures, Fittings and Equipment (Apartments):** Sanitary ware, kitchen fittings and electrical installations are designed to be user-friendly, durable and of appropriate finish.
	(Housing LIN, 2008a) (North Tyneside Council, 2007)	**Fixtures, Fittings and Equipment (Communal Spaces):** Sanitary ware, kitchen fittings, electrical installations, loose and soft furnishings (including blinds), equipment and white goods, are designed to be user-friendly, durable and of appropriate finish.
	(CABE, 2008) (Department of Health, 2008) (Housing LIN, 2008a) (North Tyneside Council, 2007)	**External Works:** Street and Garden Fittings and Furniture.
	(Association of Chief Police Officers Crime Prevention Initiatives, 2004) (CABE, 2008) (Defence Estates, 2008) (Department of Health, 2008) (Housing Corporation, 2008a & b) (Housing LIN, 2008a) (North Tyneside Council, 2007)	**External Lighting:** External Lighting (including lighting to features).

The study revealed 52 issues, identified in Table 4.11. These sub-headings appear under each category heading and their number is determined by the issues raised in the reviewed reports and design guides. As shown in Tables 4.2–4.10, each sub-heading is accompanied by a statement.

Table 4.11: Summary of sub-headings

Categories	Sub-headings
Context	1. Sense of Place 2. Local Pattern of Development 3. Local Landscape 4. Integration
External Spaces	5. Landscaping 6. Parking 7. Boundary treatment
Building Form	8. Building scale 9. Elevations 10. Definition 11. Variety 12. Relationship with external space
Entrances	13. Positioning 14. Definition and Shelter 15. Natural Surveillance 16. Internal Character 17. Hierarchy of Spaces 18. Other Entrances
Communal Spaces	19. Arrangement 20. Communal Subspaces 21. Composition 22. Amenities 23. Volumes 24. Internal connections
Service Spaces	25. Laundry 26. Buggy Stores 27. Bin Stores 28. Refuse Strategy 29. Plant Rooms and Service Ducts 30. Ancillary Storage
Circulation Spaces	31. Corridors 32. Lifts 33. Staircases
Apartments	34. Number of Apartments 35. Layouts 36. Use of Space 37. Adaptability 38. Daylighting 39. Acoustics 40. Storage 41. Apartment Entrance
Architectural Components	42. Building Envelope 43. External Doors and Windows 44. Internal Doors 45. Internal Walls 46. Internal Finishes 47. Lifts 48. Staircases 49. Apartment Fittings and Equipment 50. Communal Fitting and Equipment 51. External Works 52. External Lighting

4.2 Quality Issues and Criteria

Having established the nine section headings for the Tool, and the sub-headings and quality statements for each section, it was necessary for criteria to be established, against which the designs will be assessed. The criteria are determined from a literature review that exemplifies aspects of high quality in house design and sheltered housing in particular.

The literature on housing research is substantial, and therefore a methodology was needed to filter and focus the sources for the criteria. It was therefore concluded that the literature search would be based on the most prevalent references in academic journal papers related to the nature of home for older people and the related principles of design quality. The years from 1997 to 2011 represented a period of particular attention to design in the UK built environment. This stemmed from unprecedented interest in design quality by the new Labour government (Carmona, 2001). The clearest expression of this government interest was its establishment of the Commission for Architecture and the Built Environment (CABE). In 2011, funding was withdrawn from CABE, as the Coalition Government turned its attention to matters other than design quality.

Step 1 in the process was to search academic journal papers during this period for quality aspects related to human needs, place and house, in relation to home and the accommodating older people (see Figure 4.7). One hundred and twelve relevant academic journal papers were identified from which to derive the criteria. Step 2 was to list the references in these papers. Step 3 determined which publications in these papers related to the established sub-headings and statements, and therefore could be regarded as seminal works. Step 4 was to list the seminal authors and publication dates. Step 5 was to analyse the publications to establish themes under the sub-headings; and step 6 to feed the themes into the Tool to generate the quality criteria. It is recognised that a selection process has taken place in the choice of literature. However, it is a process that explores the sources of recent research in this topic area.

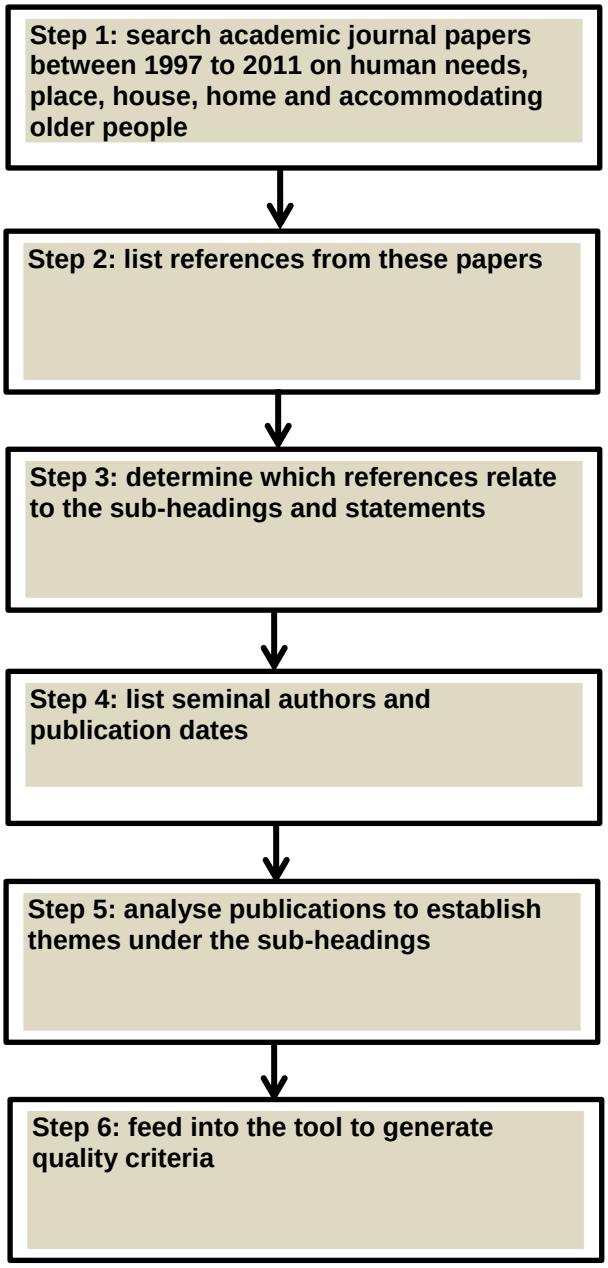


Figure 4.7: Methodology for generating criteria

The output from step 4 of the process is shown in Table 4.12.

Table 4.12: List of seminal publications

Alexander et al., 1977a; 1977 b
Alexander, 1979; 2000; 2002
Altman, 1975; 1976; 1977, 1992
Altman and Low, 1992
Altman and Rogoff, 1987
Altman and Werner, 1985
Altman and Winsel, 1977
Appleyard, 1979

Barnes et al., 2001; 2011
Barnes, 2002; 2006
Benjamin, 1995a; 1995b
Buttimer, 1980
Buttimer and Seamon, 1980

Canter, 1977a; 1977b; 1983; 1997
Canter and Canter, 1979
Casey, 1997
Chapman and Hockey, 1999
Cooper, 1974;1976; 1995

Day, 2002; 2004
Despres, 1991a; 1991b
Douglas, 1991
Douglas and Douglas, 2005
Dovey, 1978; 1985
Duncan and Duncan, 2001
Dupuis and Thorns, 1996; 1998

Feldman, 1990; 1996

Gesler 1991; 1992; 1993; 1996; 2005; 2009
Giuliani, 1991; 2003
Giuliani and Feldman, 1993
Gurney, 1990; 1997; 2000

Hay, 1990; 1998a; 1998b
Hayward, 1975, 1977
Heidegger, 1962; 1971; 1977; 1993
Horwitz and Tognoli, 1982

Kearns and Gesler, 1998
Kearns et al.,2000

Lawrence, 1987a; 1987b; 1995; 2002
Lawrence and Low, 1990
Lawson et al., 2002
Lawson et al., 2003
Lawson, 2001; 2003; 2005
Lawton, 1982; 1985; 1987; 1989a; 1989b; 1990; 1994; 1998; 2001
Lawton et al., 2000
Low, 2003; 2008
Low and Altman,1992
Low and Smith, 2006

Macmillan, 2004; 2005; 2006
Marcus, 1976; 1995;1997
Mallett, 2003; 2004
Maslow, 1954; 1968
Massey, 1992; 1994; 1995; 1997; 2005
Massey and Jess, 1995
Moore, 1998; 2000a; 2000b
Moore et al., 1995
Moore and Canter, 1991; 1993

Newell, 1994; 1995
Newman, 1972; 1973; 1996
Nezlek, 2001
Nezlek et al. 1994; 2002
Nezlek and Reis, 1999
Norberg-Schulz, 1965; 1971; 1979

Oswald and Wahl, 2005

Parker et al., 2004
Passini et al., 1998; 2000
Porteous, 1976
Porteous and Smith, 2001
Proshansky et al., 1970, 1983
Proshansky, 1978

Rapoport 1969; 1980; 1982; 1985; 1988; 1990; 1995; 1998
Relph, 1976; 1978
Rivlin,1987; 1990; 1996
Rivlin and Moore, 2001
Rowles, 1980; 1983
Rowles and Ravdal, 2001
Rubinstein, 1989; 1990; 1993
Rubinstein and de Medeiros, 2004; 2005
Rubinstein and Parmelee, 1992

Saunders, 1989; 1990
Saunders and Williams, 1988
Seamon 1979; 1984; 2000
Seamon and Mugerauer, 1985
Shumaker and Taylor, 1983
Sixsmith, 1986; 1992
Sixsmith and Sixsmith, 1991
Smith, 1994
Somerville, 1992; 1997
Stedman, 2002; 2003
Stedman et al., 2004
Stokols and Shumaker,1981

Tognoli, 1987
Torrington, 1996; 2004; 2007
Tuan 1974; 1975; 1977; 2001

Ulrich, 1984;1986
Ulrich et al., 1991

Wahl et al., 2009
Werner et al., 1985;1993

The other steps are detailed in http://architecturedesignqualityevaluation.moonfruit.com/.

The themes identified by analysis of the publications (Step 5) under each of the sub-headings generated 164 criteria, grouped by statements. Just as

there is no standard number of sub-headings and statements for each section heading, so there are not a standard number of criteria under each sub-heading. The number of criteria in every case was determined by the number of themes raised in the publications.

4.2.1 **Context**

The issues within the Context category have been identified as sense of place, local pattern of development, local landscape, and integration. The intention is that criteria are specifically referenced to the publications. The themes for the criteria were developed under the sub-headings as follows:

Sense of Place

The statement introduces sense of place as contributing to community pride and civic identity. This issue generated three related themes. The first one deals with the general characteristic of the building and surrounding spaces responding to the local character of the area. This is set out by Proshansky (1978), Proshansky, Fabian, and Kaminoff (1983), Rapoport (1995), Relph (1976, 1978) and Rowles (1980). It is the need to identify local character and consider if the scheme is sympathetic to it. According to the literature, most attractive streets include a variety of building styles, materials and forms of construction, from different periods, but collectively form a harmonious group related to local character (Alexander, 2002; Altman and Low, 1992; Appleyard, 1979; Benjamin, 1995a and b; Buttimer, 1980; Canter, 1977b; Casey, 1997; Cooper, 1974; Dovey, 1985; Feldman, 1990; Gurney, 1990; Giuliani, 2003; Heidegger, 1962, 1971; Horwitz and Tognoli, 1982; Lawrence, 2002; Marcus, 1976, 1997; Norberg-Schulz, 1979; Proshansky, 1978; Proshansky et al., 1983; Rapoport, 1995; Rowles, 1980; Smith, 1994; Tognoli, 1987; Werner et al., 1993).

The second theme relates to the elements of a design that are deemed to be landmark features but not imposing or dominant in terms of their scale and appearance (Altman, 1992; Duncan and Duncan, 2001; Lawrence, 2002; Lawrence and Low, 1990; Macmillan, 2004; Rapoport, 1982) The third considers public space in and around the building – defined in an attractive

and user-friendly manner in terms of appearance, access, and safety and convenience to users (Alexander, 2002; Barnes et al., 2011; Canter, 1977b, 1983; Despres, 1991b; Giuliani, 2003; Feldman,1996; Lawrence, 2002; Lawton,1990, 1998; Mallett, 2003, Maslow,1954, 1968; Norberg-Schulz, 1965, 1979; Rapoport, 1982, 1995).

Local Pattern of Development

The aim of this statement is to evaluate how well the proposals respond to the local pattern of development, historic fabric and architectural heritage of the area (Casey, 1997; Day, 2004; Rapoport, 1990a). This subject generated four interrelated themes. The first of these deals with whether a design – either urban or rural – has forms and detailing which show originality in the way that they have been arranged. Accordingly, every design needs to respond to the patterns that are already established in order to make a positive contribution to the development of its surroundings (Alexander, 2002; Appleyard, 1979; Casey, 1997; Massey, 1994, 1995, 1997; Massey and Jess, 1995; Rapoport, 1990a; Saunders and Williams, 1988; Seamon, 1984).

The second theme is about ensuring that the silhouette and roofline of the proposed building fits in well with the surroundings. The first impression of the height, proportion and materials should relate to the context within the overall rhythm of the street scene. The facades should respond to the materials featured on surrounding buildings, creating interesting contrasts and textures between complementary materials (Alexander, 2002; Day, 2004; Rapoport, 1990a).

The third theme considers appropriate ratios of heights of the buildings to the street and widths of squares. The public realm is defined by height as well as width or, more accurately, the ratio of height to width (see Figure 4.8).

	Maximum	Minimum
Minor streets, e.g. mews	1:1.5	1:1
Typical streets	1:3	1:1.5
Squares	1:6	1:4

Figure 4.8: Height-to-width ratio
Source: http://www.scotland.gov.uk/Publications/2009/01/27140909/6

All urban places should be created on a pedestrian scale by defining space with buildings; this is a fundamental urban design principle. Careful consideration of how to create a comfortable, proportionate, human scale, as well as sufficient visual interest, is a primary objective (Lawson, 2001). There are no fixed rules but account should be taken of the variety of activities taking place in the street or square and the scale of the buildings on either side (see Figures 4.9 and 4.10).

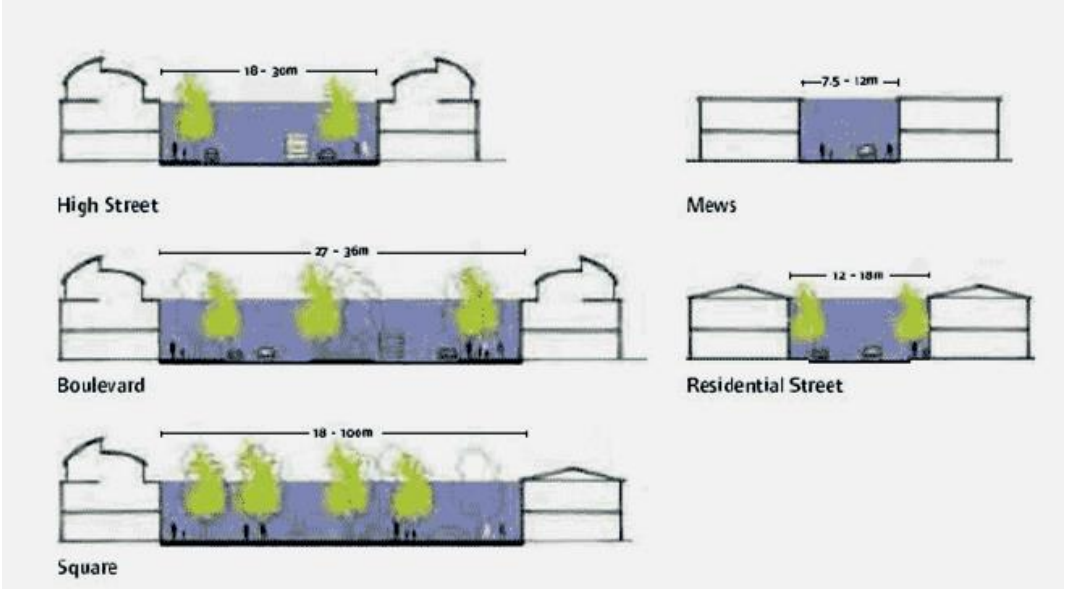


Figure 4.9 Typical street and square widths
Source: http://www.scotland.gov.uk/Publications/2009/01/27140909/6

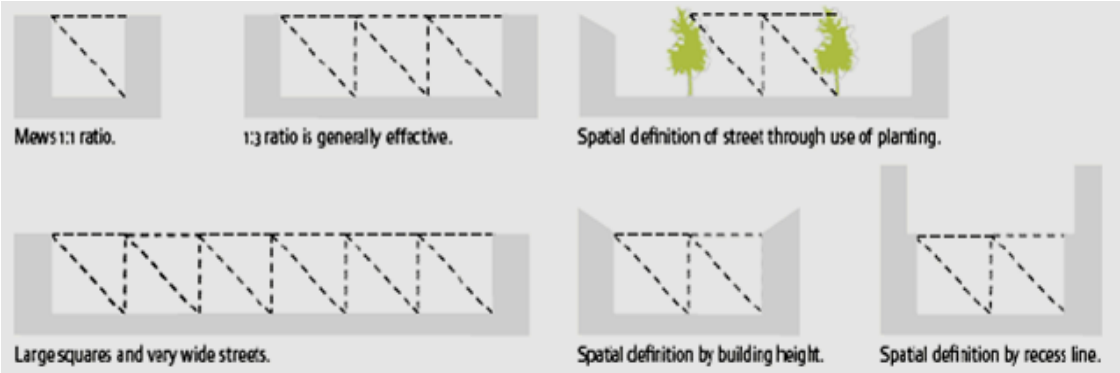


Figure 4.10: Typical street and square types and width ratios
Source: http://www.scotland.gov.uk/Publications/2009/01/27140909/6

The fourth theme is about the routes into and adjacent to the site that contribute to the accessibility of the scheme. Existing routes may have significant historic value to the pattern of development in the area and to its identity. A proposal should consider historic patterns of movement in the area, analysing important places people travel to and their means of transport. Retaining and enhancing, or restoring, these historic routes should be considered as a means of connecting the scheme with its surrounding area (Alexander, 2002; Appleyard, 1979; Rapoport, 1982; Shumaker and Taylor, 1983).

Local Landscape

Opportunities should be taken to utilise and celebrate any existing natural or man-made features that have offer the site special identity (Rapoport, 1982; Stokols and Shumaker, 1981). A design will evoke richness and variety if it makes a place special. This can be incorporated into the scheme through topography, orientation, framed views and vistas. Views into and out of the site should be maximised and local characteristics can become a feature of the overall design (Alexander, 2002; Altman and Low, 1992; Canter, 1977b; Casey, 1997; Despres, 1991a and b; Rapoport, 1990a; Rivlin, 1987; Seamon, 1979).

Integration

The aim of the statement is to appraise how the site layout could be well integrated with the existing roads, footpaths and cycle paths etc., providing good access to existing local facilities, including shops, etc. This statement generates two linked themes. The first one deals with access to local amenities, which should be convenient with safe and clear connections to existing routes and desire lines (Altman, 1975; Despres, 1991b; Mallett, 2004; Kearns et al., 2000; Saunders, 1989, 1990; Torrington, 1996). The second one suggests that it should also be a pleasurable journey by taking advantage of existing landmarks, views and vistas. The building form and its layout on site should enhance existing features and create new ones. The approach should maximise views to landmark features and also provide a connection between the building and the neighbourhood (Low, 2008; Rapoport, 1982, 1988, 1990; Stedman, 2002, 2003; Stedman et al., 2004). See Table 4.13 that summarise the Context category, with the sub-headings, together with criteria for each statement.

Table 4.13: Shows the Context category, with the sub-headings, together with criteria for each statement

1.00 Context			
Ref.	Sub-headings	Criteria	
1.01	**Sense of place** (Alexander, 2002; Altman and Low, 1992; Appleyard, 1979; Benjamin, 1995a & b; Buttimer,1980; Canter, 1977b; Casey, 1997; Cooper, 1974; Dovey, 1985; Feldman, 1990; Gurney, 1990; Giuliani, 2003; Heidegger, 1962, 1971; Horwitz and Tognoli, 1982; Lawrence, 2002; Marcus,1976;1997; Norberg-Schulz, 1979; Proshansky, 1978; Proshansky et al., 1983; Rapoport, 1995; Rowles, 1980; Smith, 1994; Tognoli, 1987; Werner et al., 1993)	1	General characteristics of building and surrounding spaces in relation to the local character of the area in which it is set
	(Altman, 1992; Duncan and Duncan, 2001; Lawrence, 2002; Lawrence and Low, 1990; Macmillan, 2004; Rapoport, 1982)	2	Landmark features, without being imposing or dominant

1.00 Context			
Ref.	Sub-headings	Criteria	
	(Alexander, 2002; Barnes et al., 2011; Canter, 1977b, 1983; Despres, 1991b; Giuliani, 2003; Feldman,1996; Lawrence, 2002; Lawton,1990, 1998; Mallett, 2003, Maslow,1954, 1968; Norberg-Schulz, 1965, 1979; Rapoport, 1982, 1995)	3	Defining public space in an attractive and user-friendly manner
1.02	**Local pattern of development** (Alexander, 2002; Appleyard, 1979; Casey, 1997; Massey, 1994, 1995, 1997; Massey and Jess, 1995; Rapoport, 1990a; Saunders and Williams, 1988; Seamon, 1984)	1	Responding to local patterns of development
1.02 (ctd)	(Alexander, 2002; Appleyard, 1979; Rapoport, 1982; Shumaker and Taylor, 1983)	2	Height, proportions and materials are appropriate to the surroundings
	(Lawson, 2001)	3	The ratio between the heights of buildings and the widths of streets are between 1:1 and 1:3
	(Alexander, 2002; Day, 2004; Rapoport, 1990a)	4	Historic routes retained
1.03	**Local landscape** (Alexander, 2002; Altman and Low, 1992; Canter, 1977b; Casey, 1997; Despres, 1991a & b; Rapoport, 1982; 1990; Rivlin, 1987; Seamon, 1979; Stokols and Shumaker,1981)	1	Existing elements that give the site a special identity are retained
1.04	**Integration** (Altman,1975; Despres, 1991b; Mallett, 2004; Kearns et al., 2000; Saunders, 1989, 1990;Torrington, 1996)	1	Safe and convenient to use
	(Low, 2008; Rapoport, 1982, 1988, 1990; Stedman, 2002, 2003; Stedman et al., 2004)	2	Pleasurable and experience-enhancing journey by taking advantage of existing landmarks, views and vistas

4.2.2 **External Space**

The issues in external space have been defined as landscaping, parking and boundary treatment.

Landscaping

The statement establishes that the landscaping and the gardens should be successfully integrated with the building, and that the external public and private spaces can be naturally surveyed, promoting personal safety and security. This generated ten related themes. The first deals with the aspects

that maximise the use and value of outdoor space, offering a variety of experiences and features that provide interest and enjoyment (Gurney, 1990; Hay, 1990; Rapoport, 1985; 1990; Ulrich, 1984; 1986; Ulrich et al., 1991). Every area of external garden should have a clear and logical purpose and all features should be clearly identified including seating arrangements (see Figure 4.11), focal points, private patios, meeting places and activity areas.

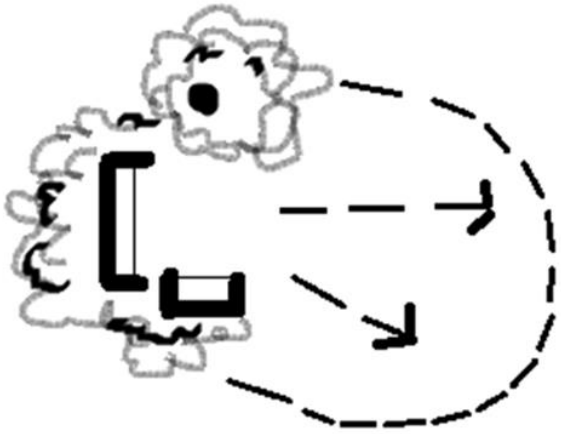


Figure 4.11: Looking outwards in the garden
Source: Author

Building forms should be grouped to create spaces which are well defined and have a clear purpose and function. The external spaces should be appropriately oriented to maximise sunlight and use (see Figure 4.12) (Alexander, 1979; Appleyard, 1979; Canter, 1977b; Canter and Canter, 1979; Dovey, 1985; Dupuis and Thorns, 1998; Gesler, 1991, 1992, 1996; Kearns and Gesler, 1998; Gurney, 1990; Hay, 1990; Rapoport, 1985, 1990; Ulrich, 1984, 1986; Ulrich et al., 1991).

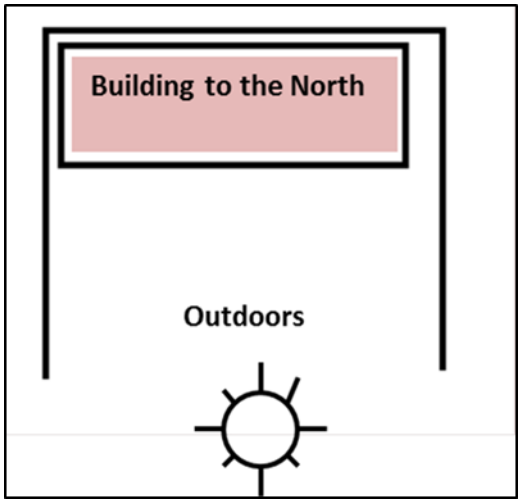


Figure 4.12: External spaces with southerly orientation

Source: Author

The second theme deals with the provision of clear and direct access to external space from the internal communal areas. Routes should be rational, secure and provide level access. Consideration should also be given to provide access to external space from individual apartments including patios, balconies and terraces (Douglas and Douglas, 2005; Dovey, 1985; Somerville, 1992).

The third theme is that the soft and hard landscaping provide should be easy to maintain with low maintenance design and use of materials. Landscaping that is difficult and inconvenient to access should be avoided, demonstrating a clear and secure access strategy (Norberg-Schulz, 1965; Rapoport, 1982; Relph, 1976). The fourth concerns the opportunity for residents to take ownership of spaces and engage with the garden areas (Despres, 1991b; Dovey, 1985; Dupuis and Thorns, 1996; 1998; Lawson et al., 2003; Moore 2000a and b; Newell, 1995; Porteous and Smith, 2001; Somerville, 1992; Tognoli, 1987; Werner et al., 1985). Consideration should be given to the provision of sheds, greenhouses, raised beds, allotments and sensory gardens (Altman, 1975). Where applicable, features should be appropriately scaled and proportioned for tenants to easily manage to cultivate and maintain the garden.

The fifth theme promotes natural surveillance of private and public external spaces so that security is not entirely dependent on systems such as CCTV. All external areas should be overlooked from internal communal areas, apartments or circulation spaces (Douglas and Douglas, 2005; Newman, 1973; Saunders, 1989; Somerville, 1992). The sixth theme notes that a design should clearly define a hierarchy of external spaces through volume and progression (Alexander et al., 1977a; Smith, 1994; Tognoli, 1987). For example, the main communal garden should be the largest external space in the most beneficial location. Progression through different garden spaces should also be thoughtfully considered to provide the users with an interesting journey, and paths that follow the contours or natural features of a site will best integrate schemes into their surroundings (Alexander, 2002; Altman, 1975; Altman and Werner, 1985; Barnes, 2002; Canter, 1997; Cooper, 1976; Gesler, 1992, 1993; Smith, 1994; Tognoli, 1987).

The seventh theme is about providing a good balance between hard and soft landscaping that could offer therapeutic qualities and maximise the natural environment. Ground materials and changes in level should be safe and clear. Hard landscaping should be provided for pedestrian routes and incorporated into the overall landscaping (Canter, 1977b; Gesler, 1992, 1993; Somerville, 1992; Ulrich, 1984, 1986; Ulrich et al., 1991). The eighth deals with private gardens and patios, which should be easily identifiable and have clearly defined territory (Despres, 1991a; Douglas, 1991; Dupuis and Thorns, 1996; Gesler, 1992). A variety of landscaping and change of ground surface texture can provide a clear distinction between public and private areas. Territoriality can also be demonstrated by using different border elements like raised beds, shrubs, etc. (Altman, 1975; Barnes, 2002; Cooper, 1976; Despres, 1991b; Douglas, 1991; Dupuis and Thorns, 1996; Gesler, 1992; Lawrence, 1987a; Somerville, 1992; Werner et al., 1985).

The ninth theme is aimed at ensuring that all areas of external space should be accessible for users with physical disabilities, visual or sensory impairment. Changes in levels should be clearly identified and designed to assist accessibility for all. Proper consideration should be given to the access into and the progression through the external space, especially any changes

in level and the design and detailing of hard landscaping (Gesler, 1996, 1993, 2005; Sixsmith, 1992; Ulrich et al., 1991). The selection of plants and features should promote a sensory environment with colour, sound, aroma and texture. Such features enable residents to identify and relate to their surrounding environment (Barnes, 2002, 2006; Canter and Canter, 1979; Dupuis and Thorns, 1996; Gesler, 1991, 1992, 1996, 1993, 2005; Kearns and Gesler,1998; Lawrence 1987a and b; Lawson et al., 2002; Lawton, 1982, 1990, 1998; Sixsmith, 1992; Sixsmith and Sixsmith, 1991; Somerville,1992; Ulrich, 1984, 1986; Ulrich et al., 1991).The final theme relates how surfacing and footpath definition can create more attractive floorscapes. Due care should be given to the durability of chosen materials and detailing which considers function and aesthetics (Day, 2004; Norberg-Schulz, 1965).

Parking

The next issue, under the section heading of external spaces, is parking for residents and visitors, with appropriate provision for disabled people. This statement produced the following six themes:

The first aspect is that the design of the parking area should blend with the overall site layout to provide a coherent and inviting entrance (Alexander et al., 1977a and b). Rather than the ubiquitous tarmac, greater variety in surfacing and footpath classification should be sought to create more attractive floorscapes. This could blur the separation between the car and pedestrian, with the concept of a common user space often reducing vehicle speeds in the process. Keeping speeds down should be one of the main aims of any residential layout to create environments which are safe and accessible for all. The parking area should be functional and attractive using techniques to divide groups of parking bays with interesting landscaping (Day, 2002; Torrington, 2007) (see Figure 4.13).

Figure 4.13: Parking bays with interesting landscaping
Source: http://www.odestreet.com/2013/06/trees-worth-more-than-parking-spaces.html

Secondly, the parking area should be located close to the main entrance of the building for clear and convenient access. Consideration should also be given to local public transport links to minimise the need for parking within the grounds (Lawton, 1990, 1998; Lawrence, 1987b; Newman, 1972, 1973, 1996). The third theme concerns minimising the visual dominance of cars with consideration given to nearby internal functions of the proposed building and outward views. It is important to ensure that the fronts of properties are not dominated by cars and appropriately buffered by innovative landscapes (Alexander et al., 1977a; Day, 2002). The fourth theme is that natural surveillance should be achieved by the entrance, communal areas and/or apartments overlooking the parking area. Lighting should be carefully considered for way-finding, safety and security, covering all vulnerable areas (Douglas and Douglas, 2005; Mallett, 2004; Newman, 1972, 1973, 1996). Fifth, the design should demonstrate that there is a clear and safe pedestrian access route to the main entrance from the site boundary and car park, without users having to cross over flows of traffic (Alexander et al., 1977a; Passini et al., 1998, 2000). Parking layouts should not form a barrier to pedestrians, cyclists or larger vehicles such as those for refuse or removal. The final theme is that an unobstructed approach and safe access for ambulance vehicles should be clearly demonstrated and there should be an

ambulance parking bay in close proximity to the main entrance. This bay should be suitably sized and unobstructed to gain quick and direct access to the building. A safe transfer route from the building to the parked ambulance should be provided (Torrington, 2004).

Boundary Treatment

The statement introduces the notion that boundary treatments should be appropriate in scale and material, and promote security. This issue generated the following four related themes. First, the boundary treatments should have an appropriate scale in relation to the building and surroundings (Alexander, 2000; Kearns et al., 2000; Lawson, 2001). The height should not have a negative impact on the building or the neighbouring properties and spaces (Newman, 1972, 1973). The second theme is that boundary materials and treatments should be appropriate, attractive, durable and unobtrusive. The boundary treatment should be sympathetic to the street and the public domain. The site should appear as a meaningful enclosure without cutting off views; promoting good natural surveillance and a safe, pleasant route passing by and approaching the site entrance. Where an opportunity arises, valuable boundary materials of aesthetic or historic worth should be authentically reinstated (Alexander et al., 1977a; Norberg-Schulz, 1965). Thirdly, the design and detailing of the boundaries should not assist unwanted access into the grounds in terms of a breach of security. The boundary treatment should provide a secured means of access from the site entrance and car park into the other external spaces (Canter, 1977a; Despres, 1991a and b; Mallett, 2004; Torrington, 2007). Access to the communal gardens should be strictly via the main entrance and communal spaces within the building. The fourth theme is that the boundary treatment should not adversely affect the connection between the site and its surroundings (Lawrence, 1987b, 1995). The way the site interacts with spaces beyond its boundaries is very important in helping people to feel positive about the community in which they live. Boundary treatments should be designed in such a way that high fences and walls do not create defensive space and gated communities (Appleyard, 1979; Low, 2003, 2008;

Low and Smith, 2006; Sixsmith and Sixsmith, 1991). See Table 4.14 that summarise the External Spaces category.

Table 4.14: Shows the External Space category, with the sub-headings, together with criteria for each statement

2.00 External Space			
Ref.	Sub-headings	Criteria	
2.01	**Landscaping** (Alexander, 1979; Appleyard, 1979; Canter, 1977b; Canter and Canter, 1979; Dovey, 1985; Dupuis and Thorns, 1998; Gesler, 1991, 1992, 1996; Kearns and Gesler,1998; Gurney, 1990; Hay, 1990; Rapoport, 1985, 1990; Ulrich, 1984,1986; Ulrich et al., 1991)	1	Every area of external space has a clear use and maximises interest and enjoyment. Oriented to maximise daylight and shaded areas are provided where appropriate
	(Douglas and Douglas, 2005; Dovey, 1985; Somerville,1992)	2	Clear access to external space from internal communal areas and apartments where appropriate
	(Norberg-Schulz, 1965; Rapoport, 1982; Relph, 1976)	3	External spaces easy to maintain
	(Altman, 1975; Despres, 1991b; Dovey, 1985; Dupuis and Thorns, 1996; 1998; Lawson et al., 2003; Moore 2000a & b; Newell, 1995; Porteous and Smith, 2001; Somerville,1992; Tognoli, 1987; Werner et al., 1985)	4	Residents have the opportunity of ownership
	(Douglas and Douglas, 2005; Newman, 1973; Saunders, 1989; Somerville,1992)	5	Natural surveillance, discouraging blind spots. Casual surveillance from both communal areas and apartments. Avoid blank walls facing public space
	(Alexander, 2002; Altman, 1975; Altman and Werner, 1985; Barnes, 2002; Canter, 1997; Cooper, 1976; Gesler, 1992, 1993; Smith, 1994; Tognoli, 1987)	6	Hierarchy of spaces clearly identified
	(Canter, 1977b; Gesler, 1992, 1993; Somerville, 1992; Ulrich, 1984, 1986; Ulrich et al., 1991)	7	Appropriate variety of soft and hard landscaping
	(Altman,1975; Barnes, 2002; Cooper, 1976; Despres, 1991b; Douglas, 1991; Dupuis and Thorns, 1996; Gesler, 1992; Lawrence, 1987a; Somerville,1992; Werner et al., 1985)	8	Private gardens and patios (off the apartments) clearly defined as being different to the communal gardens

2.00 External Space			
Ref.	Sub-headings	Criteria	
	(Barnes, 2002, 2006; Canter and Canter, 1979; Dupuis and Thorns, 1996; Gesler, 1991, 1992, 1996, 1993, 2005; Kearns and Gesler,1998; Lawrence, 1987a & b; Lawson et al., 2002; Lawton, 1982, 1990, 1998; Sixsmith, 1992; Sixsmith and Sixsmith, 1991; Somerville,1992; Ulrich, 1984, 1986; Ulrich et al., 1991)	9	Design and access of external spaces maximise their use by residents with physical disabilities, visual and/or sensory impairment
	(Day, 2004; Norberg-Schulz, 1965)	10	Choice of materials and detailing are durable and robust
2.02	**Parking** (Alexander et al., 1977a; Day, 2002; Torrington, 2007)	1	Integrated with overall landscaping scheme
	(Lawton,1990, 1998; Lawrence, 1987b; Newman, 1972, 1973, 1996)	2	Close to the main entrance of the building
	(Alexander et al., 1977a; Day, 2002)	3	Visual dominance of cars is minimised from both the external and internal spaces
	(Douglas and Douglas, 2005; Mallett, 2004; Newman, 1972, 1973, 1996)	4	Natural surveillance achieved, plus lighting for way-finding, safety and security
	(Alexander et al., 1977a; Passini et al., 1998, 2000)	5	Segregated and safe pedestrian access to the building entrance
	(Torrington, 2004)	6	The approach and access for ambulance should be clear
2.03	**Boundary treatment** (Alexander, 2000; Kearns et al., 2000; Lawson, 2001)	1	Appropriate scale relative to the building and surroundings
	(Alexander et al., 1977a; Norberg-Schulz, 1965)	2	Appropriate materials used which are attractive, durable and unobtrusive
	(Canter, 1977a; Despres, 1991a & b; Mallett, 2004; Torrington, 2007)	3	Consideration to be given to ‘secure by design’ principles
	(Appleyard, 1979; Lawrence, 1987b, 1995; Low, 2003, 2008; Low and Smith, 2006; Sixsmith and Sixsmith, 1991)	4	Avoid creating a ‘gated community’; the external space opens up to the wider community when appropriate, and avoid prison/institutional aesthetics on boundary treatment

4.2.3 **Building Form**

The issues in the Building Form category have been identified as building scale, elevation, definition, variety, and relationship with external space.

Building Scale

The building scale issue raised three related themes. The first one is that the building should have domestic scale. Every aspect of the design should consider the people who would use it. Sizes in relation to the human form are used to create comfortable environments, and therefore a human scale needs to be demonstrated throughout. Fenestrations should be arranged to define the floor levels within. Scale is not just about the size, but also the apparent size. The elements of a building and the level of detail can imply that a building is larger or smaller than it really is (Alexander, 1979; Altman and Low, 1992; Buttimer and Seamon, 1980; Buttimer,1980; Moore, 2000a and b; Lawrence 1987a and b). The second theme is about the massing of the proposed scheme representing the volumes within, which affects the widths, heights and rooflines of the overall building form. A coherent composition of all elements of the scheme should be demonstrated in the organisation of the hierarchy of masses (Barnes et al., 2001; Buttimer and Seamon, 1980; Cooper, 1976; Duncan and Duncan, 2001; Mallett, 2003; Rapoport, 1982). For example, a pattern of massing may emphasise the corner of an existing street. Generally, the larger volumes of the communal areas should be defined by larger building elements and fenestration patterns, whereas the apartments should be more intimate. Nevertheless, there needs to be a design system guiding the appearance, so that a coherent composition is assured (Day, 2004). The third theme deals with how the buildings could be divided into visually distinct volumes in order to reduce the overall mass. Monolithic buildings should be avoided, as they are difficult for the users to interpret. The two main ways of designing in relation to this theme are either to show identifiable parts in one building or produce a number of smaller buildings, as shown in Figure 4.14 (Day, 2004; Torrington, 1996, 2007). A variety in the materiality of the facades also helps to articulate the building form.

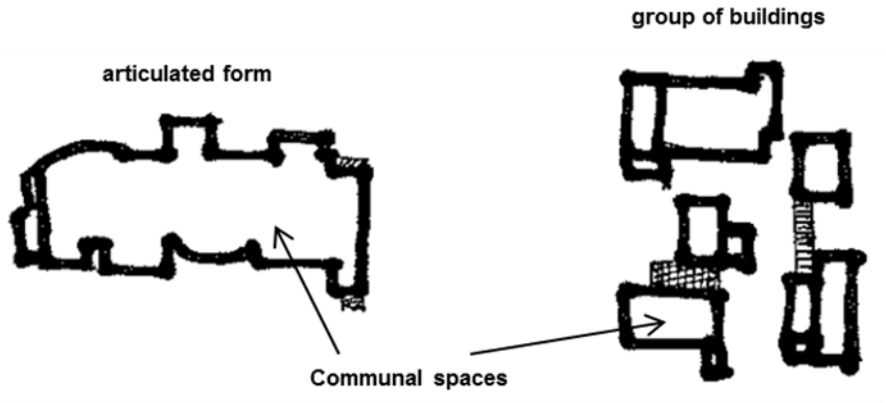


Figure 4.14: One articulated building with identifiable parts and group of buildings
Source: Author

Elevations

The next statement defines the elevations, which should be thoughtfully considered with particular attention to colour, material, texture and patterns. This raises the notion that the elevations are the most visible external features, and should be attractive and welcoming. The external materials, colours and textures should enhance and express visual enjoyment. The design of elevations can be addressed in a number of ways but should emphasise the proportions and detail of the doors and windows (Alexander, 2002; Appleyard, 1979; Barnes, 2002; Lawson, 2001). Materials should be fit for purpose. They need be durable, appropriate to the location and future proofed. The building facade can be made more interesting by its ground connectivity and relationship with the skyline (Day, 2002). Patterns and contrasts, and the arrangement and proportions of elements, can all contribute to a positive image.

Definition

The statement notes that the design should be clearly understandable and defined from the exterior and reflect the various internal uses. This statement implies that way-finding will be easier to achieve, if the building is more readily understood. The external form should clearly express where to enter, and the internal relationship and connection between spaces, both vertical and horizontal, should be apparent (Day, 2002, 2004; Lawson, 2001).

Definition of public and private domains, communal areas, apartments and service areas will all help users to read the proposed building.

Variety

The building elements can provide variety. This issue relates to two interconnected themes. The first is the point that, in trying to generate variety, designs can become complicated and confusing. While a complex scheme can create an interesting hierarchy of forms, complication can lose coherence. This may be particularly apparent at junctions, where the geometry of a form may be compromised where it meets another form. At the other end of the spectrum, simplicity is an admirable quality. However, this should not be muddled with the simplistic, which can produce naïve solutions (Alexander et al., 1977a; Day, 2004). The second theme is that the building elements and materials can provide variety and interest to the overall form. While rhythm is important to the external appearance, excessive repetition should be avoided. The aim is to move away from uniformity, for example by the use of the same proportional system at different scales (Casey, 1997; Day, 2002, 2004; Macmillan, 2004, 2005).

Relationship with External Space

The last issue under the building form section is the relationship with external space. The statement notes that the building form should contribute to positive external space and the design should be specific to the site. This statement points to two related themes. The first is that the proposed building should define external space and avoid creating incidental negative and ill-defined spaces (see Figure 4.15).

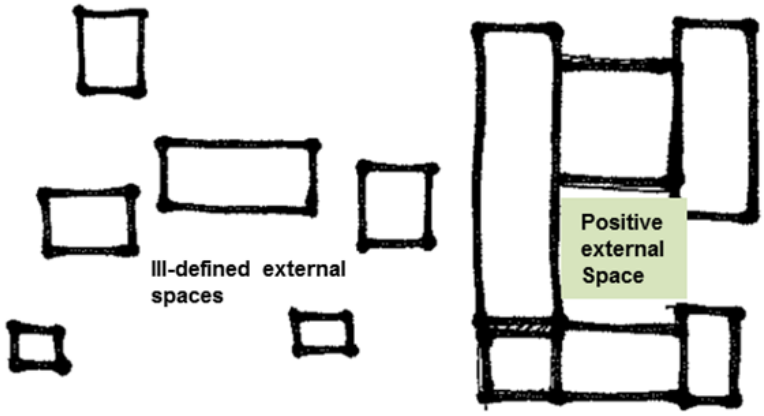


Figure 4.15: Designs showing ill-defined external spaces and positive external spaces
Source: Author

The design should be specific to the site and respond to its particular opportunities (Alexander, 2000; Tuan, 1974, 1975, 1977). The proposed building should be designed around external spaces with several entrances and connections. The building layout should reinforce and compliment the layout of external spaces and streets. The external areas should be well defined and planned for a particular use (Altman and Rogoff, 1987; Altman and Low, 1992; Buttimer, 1980; Somerville, 1992).

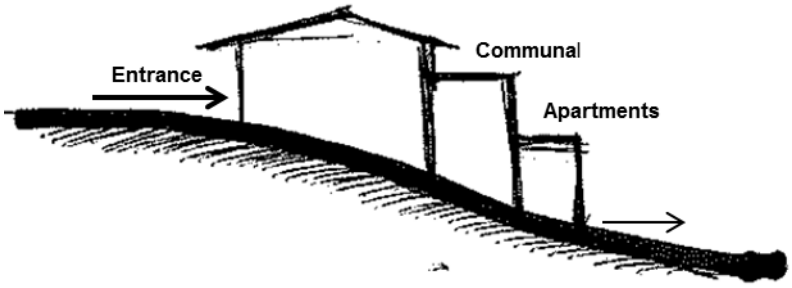


Figure 4.16: Building should be designed around external spaces
Source: http://www.arcbazar.com/home-design/project/anatolie-gordeev-tropical-single-family-house-ghana

The second theme notes that the design should acknowledge the size, shape and topography of the site. The massing of the proposed building should respond to the site dimensions and proportion, and particularly to the changes in level across the site. This should be used as a means of reducing

the apparent bulk of the proposed building and tying the design to the ground (see Figure 4.16) (Alexander, 2002; Day, 2002, 2004). See Table 4.15 that summarise the Building Form category.

Table 4.15: Shows the Building Form category, with the sub-headings, together with criteria for each statement

3.00 Building Form			
Ref.	Sub-headings	Criteria	
3.01	**Building scale** (Alexander, 1979; Altman and Low, 1992; Buttimer and Seamon,1980; Buttimer,1980; Moore, 2000a & b; Lawrence 1987a & b)	1	Building elements express human scale
	(Barnes et al., 2001; Buttimer and Seamon, 1980; Cooper, 1976; Duncan and Duncan, 2001; Mallett, 2003; Rapoport, 1982)	2	Building form is broken up into smaller units to give an association of home
	(Day, 2004; Torrington, 1996, 2007)	3	The massing of the building form is a coherent composition
3.02	**Elevations** (Alexander, 2002; Appleyard, 1979; Barnes, 2002; Lawson, 2001)	1	Particular attention given to colour, material, texture and patterns with regard to surrounding buildings
3.03	**Definition** (Day, 2002, 2004; Lawson, 2001)	1	External treatment should reflect what is inside the building, e.g. to distinguish between communal spaces and apartments from the outside
3.04	**Variety** (Alexander et al., 1977a; Day, 2004)	1	Do not create confusion; complex but not complicated, simple but not simplistic
	(Casey, 1997; Day, 2002, 2004; Macmillan, 2004, 2005)	2	Uniformity of building design has been avoided
3.05	**Relationship with external space** (Alexander, 2000; Altman and Low, 1992; Altman and Rogoff, 1987; Buttimer,1980; Somerville,1992; Tuan, 1974, 1975, 1977)	1	Buildings define external areas and avoid creating incidental negative spaces. Facilities respond to features and opportunities of the site
	(Alexander, 2002; Day, 2002, 2004)	2	Scheme acknowledges the size, shape and topography of the site

4.2.4 **Entrance**

The issues within the Entrance category are defined as positioning, definition and shelter, natural surveillance, internal character, hierarchy of spaces, and other entrances.

Positioning

This requires that the entrance to any building should be clear and logically located in relation to the anticipated points of arrival. This issue generated three interrelated themes. First, the entrance to a site should be clearly marked with a change of surface and/or brick piers or gateposts. This gives the impression that the area beyond the symbolic barrier is private. The entrance to the proposed building should be obvious on arrival. There should be a logical and unobstructed relationship between the site boundary entrance and the main entrance to the proposed building (Alexander, 2002; Day, 2002; Lawson, 2001; Passini et al., 1998, 2000). People should find their way easily with clear directions, whether they enter the site by vehicle, bicycle or on foot (Torrington, 2007). The second theme is that the location of the entrance to the building should not be hidden; it should be well defined and made conspicuous. It should also be well lit and distinctive, providing an inviting and welcoming impression for residents, visitors and the community (Passini et al., 1998, 2000; Rapoport, 1988). The third theme is that the building entrance should be legible as a consequence of its size, shape, form and use of materials. It should contribute appreciably to the sense of scale of the building, and the form of the building entrance should make the entry point apparent (Day, 2002; Passini et al., 1998, 2000; Rapoport, 1988).

Definition and Shelter

This statement explains that the entrance should be clearly defined and sheltered and due consideration should be given to prevailing winds, surrounding buildings, landscaping and amenities. This leads to two related themes. The first is that the design of the main entrance should consider the prevailing wind direction. The main entrance should avoid facing this direction as well as that of cold winds. This prevents uncomfortable internal environments near to the building entrance and decreases the cost of heating these internal spaces. Buffer zones such as trees and planting could further reduce the impact of the prevailing wind to create a more comfortable environment around the entrance (Day, 2004; Lawson, 2001). The other theme is that an appropriately sized draught lobby should be provided. The sizing should relate to the anticipated number of people moving into and out

of the proposed building (Alexander et al., 1977a; Oswald and Wahl, 2005). The lobby space should be large enough to comfortably allow access for wheelchair users.

Surveillance

This statement highlights that the entrance should encourage a good level of natural surveillance day and night, which introduced four associated themes. First, the manager's office should be located to achieve good casual surveillance over the main entrance to monitor people coming in and going out. There should be a direct connection between the manager's office and the main entrance area. Target lighting in the design could further extend the effectiveness of natural observation beyond daylight hours (Douglas and Douglas, 2005; Kearns et al., 2000; Lawton, 1989a and b; Newman, 1972, 1973, 1996). Secondly, the manager's office should be sized appropriately, clearly demonstrating the room layout in the design drawings. The minimum area of the manager's office would be 12m², to include a desk and chair, lockable storage, a small conference area with table and four chairs and wall space for a noticeboard (Rapoport, 1988; Torrington, 2007; Lawson, 2001).

The third theme is that there should be the opportunity for other internal spaces to look over the entrance area with sufficient window provision for casual observation and surveillance onto the main entrance. Casual observation provision could be considered as an integral part of the overall design (Canter, 1977b; Day, 2004; Despres, 1991a and b; Douglas and Douglas, 2005; Newman, 1972, 1973, 1996; Rapoport, 1988; Torrington, 2007; Ulrich,1984). Lastly, a security system for the main entrance should be specified. The scheme should have controlled entrances that are intended to prevent unauthorised access by non-residents (Kearns et al., 2000; Mallett, 2004; Saunders, 1989, 1990).

Internal Character

This statement indicates that the entrance should have an appropriate internal character that is in keeping with the building purpose. This leads to two themes. The first is that there should be a spacious entrance area creating a welcoming atmosphere, with appropriate seating provision and

logical connections to shared communal spaces. As the entrance area will be the first interior space that people encounter on entering the proposed building, the character is very important to the way people feel about the scheme (see Figure 4.17). A building that feels light and airy, with a generous and sociable atmosphere, portrays a homely character in its interior (Alexander, 2002; Buttimer and Seamon, 1980; Lawson, 2003; Lawton, 1994; Massey, 2005; Nezlek and Reis, 1999; Proshansky et al., 1983; Rapoport, 1969; Tuan, 1974, 1975, 1977). A domestic scale should also be demonstrated within the design.

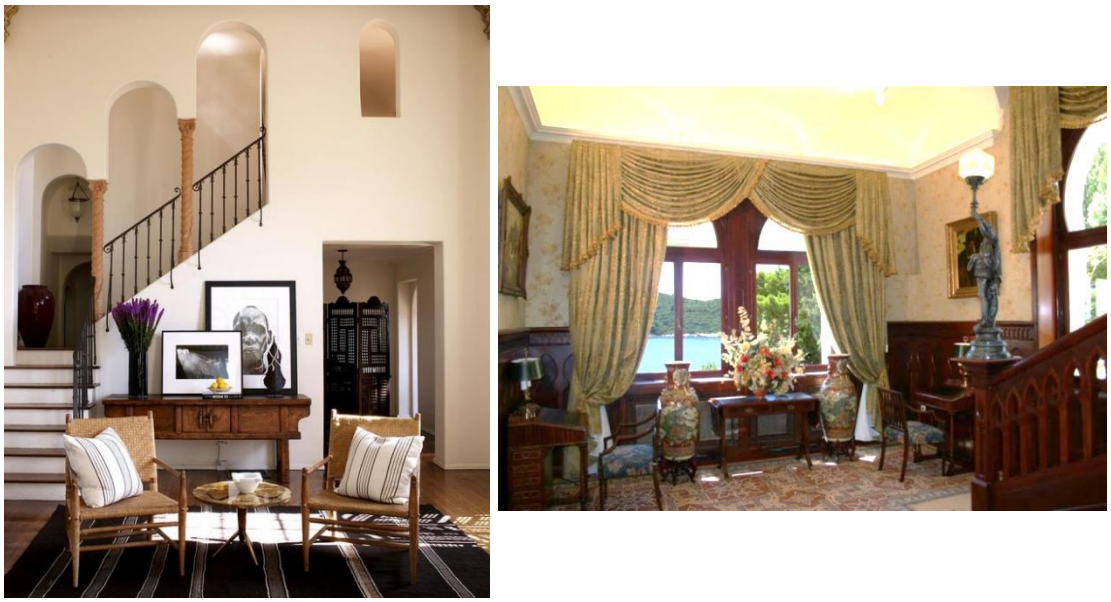


Figure 4.17: Examples of welcoming area immediately inside the entrance

Source: http://media3.onsugar.com/files/2014/01/29/805/n/1922794/4f9d7ab39d895e0c_martynlawrencebullard.jpg.xxxlarge.jpg;
http://www.croatianvillaholidays.com/en/sheherezade-dubrovnik.php

The second theme is that an institutional treatment to entrance areas should be avoided. The entrance area should incorporate a variety of appropriate materials to enhance a non-institutional character of the internal spaces. (Despres, 1991a; Lawton, 1990, 1998; Mallett, 2003; Rapoport, 1969; Seamon, 2000; Seamon and Mugerauer, 1985; Sixsmith, 1986; Somerville, 1992; 1997)

Hierarchy of Spaces

A clear hierarchy of spaces should be designed for the users, from the main entrance to individual apartments: public, semi-public, semi-private and private spaces are noted in the statement. This introduces two themes. They are that on entering the proposed building, people will be able to find their way to various parts of the building with little reliance on signage (Passini et al., 1998; Passini et al., 2000; Porteous, 1976). This is achieved by a logical hierarchy of space. Different parts of the building should have particular characters, in order to avoid confusion. Thus the design should encourage clear visual links between spaces to create a variety of spaces that relate to one another in a readily identifiable way (Altman, 1975; Altman and Werner, 1985; Cooper, 1976; Lawton et al., 2000; Norberg-Schulz, 1965, 1979; Rapoport, 1988, 1995, 1998; Rowles, 1983; Rowles and Ravdal, 2001; Werner et al., 1985). The second theme is about the security that should be incorporated into the hierarchy of the scheme. Consideration should be given to security and surveillance from the entrance area to the communal spaces, to the circulation spaces, to the apartments: i.e. public to semi-public, to semi-private, to private (see Figure 4.18) (Altman,1975, 1977; Altman and Winsel, 1977; Cooper, 1976; Despres, 1991a; Douglas and Douglas, 2005; Dovey, 1985; Dupuis and Thorns, 1998; Hayward, 1975; Kearns et al., 2000; Lawrence, 1987a; Lawton et al., 2000; Saunders, 1989; 1990; Somerville,1992; Torrington, 1996).

Other Entrances

This statement introduces the notion that other entrances and exits should have a clear hierarchy and distinctive purposes, and this leads to three related themes. The first states that other entrances and exits should be designed to enable ready supervision and security. The layout should also maximise natural surveillance so that all internal spaces in the building feel safe (Despres, 1991a and b; Lawrence, 1987a; Mallett, 2004; Saunders, 1989, 1990; Smith, 1994; Parker et al., 2004; Somerville, 1992; Tognoli, 1987; Torrington, 1996). The second theme highlights that apart from the main entrance, other doors such as those opening onto the garden or service spaces should only be used for their assigned purposes (Alexander et al.,

1977a; Norberg-Schulz, 1965). The design and location of the entrances and exits should discourage people from using them for anything other than their designed use(s). The last theme relates to fire exits, which should be designed in such a way that they are only used in the event of an emergency (Parker et al., 2004; Passini et al., 1998, 2000; Relph, 1976; Torrington, 2007). See Table 4.16 that summarise the Entrance category.

Table 4.16: Shows the Entrance category, with the sub-headings, together with criteria for each statement

4.00 Entrance			
Ref.	Sub-headings	Criteria	
4.01	**Positioning** (Alexander, 2002; Day, 2002; Lawson, 2001; Passini et al., 1998, 2000; Torrington, 2007)	1	Location of the main entrance in relationship to the site entry
	(Passini et al., 1998, 2000; Rapoport,1988)	2	Main entrance is obvious from entering the site
	(Day, 2002; Passini et al., 1998, 2000; Rapoport,1988)	3	Building entrance is legible as a consequence of its size, shape, form and use of materials
4.02	**Definition and shelter** (Day, 2004; Lawson, 2001)	1	Orientation of the main entrance provides shelter against prevailing winds
	(Alexander et al., 1977a; Oswald and Wahl, 2005)	2	Provision of an appropriately sized draught lobby
4.03	**Natural surveillance** (Douglas and Douglas, 2005; Kearns et al., 2000; Lawton, 1989a & b; Newman, 1972, 1973, 1996)	1	Position of the manager's office overlooking the main entrance
	(Rapoport,1988; Torrington, 2007; Lawson, 2001)	2	Manager's office sized appropriately, demonstrating room layout
	(Canter, 1977b; Day, 2004; Despres, 1991a & b; Douglas and Douglas, 2005; Newman, 1972, 1973, 1996; Rapoport,1988; Torrington, 2007; Ulrich,1984)	3	Provision of windows for casual observation onto the building entrance
	(Kearns et al., 2000; Mallett, 2004; Saunders, 1989, 1990)	4	Access control strategy incorporated into the main entrance
4.04	**Internal character** (Alexander, 2002; Buttimer and Seamon,1980; Lawson, 2003; Lawton, 1994; Massey, 2005;Nezlek and Reis,1999; Proshansky et al., 1983; Rapoport, 1969; Tuan, 1974, 1975, 1977)	1	Welcoming and domestic in scale and volume

4.00 Entrance			
Ref.	Sub-headings	Criteria	
4.04 (ctd)	(Despres, 1991a; Lawton, 1990, 1998; Mallett, 2003; Rapoport,1969; Seamon, 2000; Seamon and Mugerauer,1985; Sixsmith, 1986; Somerville, 1992; 1997)	2	Non-institutional in its treatment
4.05	**Hierarchy of space** (Altman, 1975; Altman and Werner, 1985; Cooper, 1976; Lawton et al., 2000; Norberg-Schulz, 1965, 1979; Passini et al., 1998, 2000; Porteous, 1976; Rapoport,1988, 1995, 1998; Rowles, 1983; Rowles and Ravdal, 2001; Werner et al., 1985)	1	Internal direction is clear/ legible and limits the requirement for internal signage
	(Altman,1975, 1977; Altman and Winsel, 1977; Cooper, 1976; Despres, 1991a; Douglas and Douglas, 2005; Dovey, 1985; Dupuis and Thorns, 1998; Hayward, 1975; Kearns et al., 2000; Lawrence, 1987a; Lawton et al., 2000; Saunders, 1989; 1990; Somerville,1992; Torrington, 1996)	2	Level of security clearly demonstrated between public and private areas
4.06	**Other entrances** (Despres, 1991a & b; Lawrence, 1987a; Mallett, 2004; Saunders, 1989, 1990; Smith, 1994; Parker et al., 2004; Somerville, 1992; Tognoli, 1987; Torrington, 1996)	1	Graded level of security
	(Alexander et al., 1977a; Norberg-Schulz, 1965)	2	The appearance and location of each entrance/exit is explicit to its purpose and importance
	(Parker et al., 2004; Passini et al., 1998, 2000; Relph,1976; Torrington, 2007)	3	Fire exits are only used in event of emergency

4.2.5 **Communal Spaces**

The issues in the Communal Spaces category are defined as arrangement, communal subspaces, composition, amenities, volumes, internal connections and lounges (Alexander et al., 1977a; Barnes, 2006).

The issues were developed as follows:

Arrangement

The statement introduces the arrangement of the communal spaces within the building and minimising preventable long journeys for the users. Layout

and grouping of spaces plays a very important role in the working of an overall scheme (Altman, 1975, 1976, 1977; Barnes, 2002). This issue generated three related themes. The first one deals with the overall strategy behind the arrangement of the spaces to accommodate the functional requirements (Lawton, 2001; Lawton et al., 2000; Altman and Low, 1992; Nezlek et al., 1994, 2002; Saunders and Williams, 1988; Tognoli,1987). The territorial interrelationship of spaces is also significant (Parker et al., 2004), which means that there should be a clear hierarchy from public to private as shown in Figure 4.18.

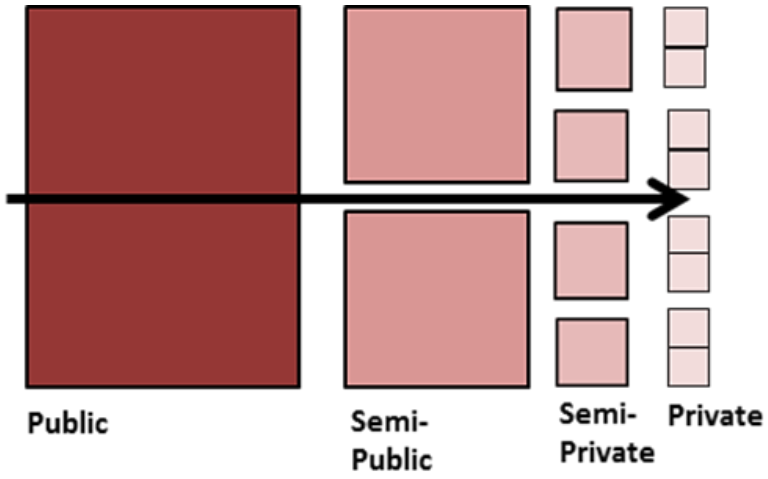


Figure 4.18: Diagram for plan arrangement

Source: Author

Spaces within a building should be planned in such a way that they create an arrangement which begins at the entrance with the most public parts of the building, then leads into the semi-public areas, and finally to the private domains (Norberg-Schulz, 1965, 1971, 1979; Porteous, 1976). The common spaces should be designed as the major activity area and spatially positioned in the public part of the building. Figure 4.19 suggests how this might be arranged on the elevation.

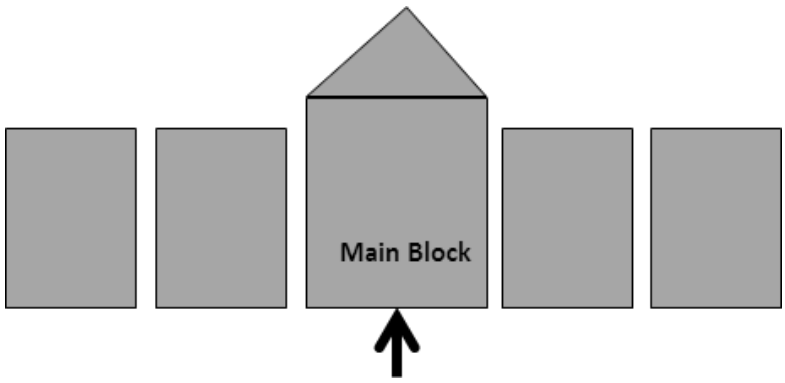


Figure 4.19: Hierarchical arrangement of the elevation
Source: Author

The second theme relates to travel distances between the apartments and the communal spaces (Torrington, 1996). The overall percentage of space devoted entirely to circulation should be kept to a minimum (Canter, 1977a; Lawton, 1982).

The third theme is access to external spaces while maintaining security (Torrington, 1996). The relationship of interior and exterior space should provide appropriate connections between the building and landscape (Gesler, 1991, 1992, 1996; Nezlek et al., 1994, 2002; Nezlek, 2001). Good access to outdoor spaces and the layout facilitating both security and enjoyment have been identified many times in the literature (e.g. Altman, 1976; Barnes, 2002; Kearns and Gesler, 1998; Lawton, 1990).

Communal Lounges and Subspaces

The aim of this statement is to evaluate the size, flexibility and distribution of the subspaces (Altman, 1975; Newell, 1995). First, it is useful to calculate the ratio of users to the area of the communal spaces to ensure that sufficient number and size of spaces are being proposed. The total area of lounges should be a minimum of $2m^2$ per apartment and appropriately distributed throughout the scheme (Lawton, 2001; Torrington, 1996). The second theme analyses the variety of lounge spaces provided for different types of activities (Altman, 1975, 1976; Barnes, 2002; Douglas, 1991; Newell, 1994, 1995; Nezlek et al., 1994, 2002; Parker et al., 2004; Proshansky et al., 1970; Saunders and Williams,1988; Somerville, 1997; Werner et al., 1985). The

main lounge acts as the central space and subspaces are represented by alcoves used for quieter activities (see Figure 4.20).

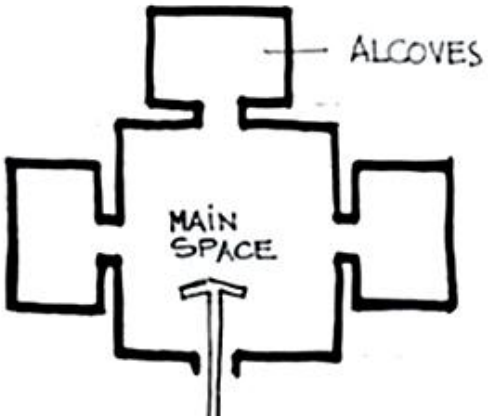


Figure 4.20: Variety of spaces
Source: Author

Thirdly, it is important that spaces should allow for adaptation, conversion or extension. It is projected that throughout the life of the building the pattern of use will change (Lawrence, 1987b; Lawton, 2001; Nezlek et al., 1994, 2002). A successful design strategy will appreciate space as a resource and maximise its utilisation (Torrington, 1996). It will also generate a comfortable design regardless of user capacity. All areas need to remain accessible. The fourth theme is to ensure that there are sufficient numbers and sizes of communal subspaces included in a design (Lawton, 2001; Proshansky et al., 1970; Relph, 1976), through appropriate subdivision of the main spaces, and the way that subspaces connected to one another (Barnes 2006). The fifth is to guarantee that there is a logical arrangement of spaces and subspaces (Barnes, 2002; Lawrence, 1987a; Nezlek et al., 1994, 2002; Passini et al., 1998, 2000). Finally, storage capacity must be sufficient, as it is easy to underestimate the amount of storage space required. Such spaces need to be appropriately located and sized. In particular, storage must be adjacent to places where items will be used (Alexander et al., 1977a; Torrington, 1996).

Composition

The objective is to encourage excitement, delight and comfort. Consideration is given to the use of multi-height spaces and mezzanine levels to engender variety. Internal communal subspaces should be composed to enhance the residents' experience, and use a variety of volumes to accommodate different communal activities (Lawson, 2003, 2005; Lawton et al., 2000; Relph, 1976; Somerville, 1992; Tuan, 1974, 1975, 1977). The interior should feel light and airy (Canter and Canter, 1979; Tuan, 1974, 1975, 1977; Ulrich, 1984). It is important to maximise the amount of daylight into the communal areas and provide views and connections with the outside. Glazing can create an open, contemporary feel. Environmental considerations such as cross-ventilation and passive solar gain contribute to comfort conditions without hindering views (Ulrich, 1984). Communal spaces also need to enhance community integration and use by family and friends (see Figure 4.21) (Altman,1975, 1976; Barnes, 2002; Douglas, 1991; Douglas and Douglas, 2005; Dovey, 1985; Dupuis and Thorns, 1996; Feldman, 1996; Giuliani and Feldman, 1993; Gurney, 1997; 2000; Hay, 1990; Nezlek et al., 1994, 2002; Porteous, 1976; Rowles, 1983; Saunders and Williams,1988; Somerville, 1997).

Figure 4.21: Enhancing community integration
Source: http://www.jrht.org.uk/communities/hartfields/introduction-to-hartfields

In addition, it was concluded that special features such as fireplaces and bay windows form important focal points in the spaces (Relph, 1976; Rowles,

1983; Somerville, 1992; Torrington, 2007; Tuan, 1974, 1975, 1977, 2001; Werner et al., 1985). The themes therefore became: varied volumes; maximising light and views; encouraging the local community, family and friends; and the provision of focal points.

Amenities

Access by the wider community can be encouraged by determining a strategy for integrating shops, services and public amenities within the schemes. The first theme is how amenities could be grouped and incorporated within the proposals (Day, 2004). The nature of the volumes should be apparent from the outside, making it easy for people to find their way to these facilities (Alexander et al., 1977a; Torrington, 2004). Visual connections, both externally and internally, help to encourage local community integration (Barnes, 2002; Dupuis and Thorns, 1996; Feldman, 1996; Giuliani and Feldman, 1993; Lawson et al, 2003; Nezlek et al., 1994, 2002; Porteous, 1976; Relph, 1976; Saunders and Williams,1988; Sixsmith, 1992; Sixsmith and Sixsmith, 1991; Somerville,1992). Finally, it is important to assess if the spaces allocated for these amenities are sufficiently adaptable to respond to change and to enable expansion (Alexander et al., 1977a; Torrington, 1996).

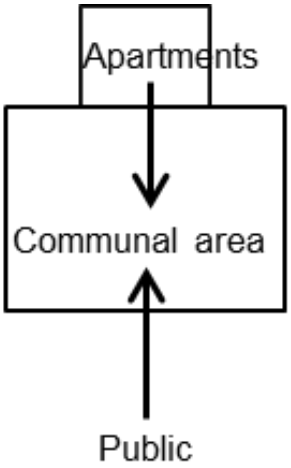


Figure 4.22: Wider community being able to access amenities without having to enter the main accommodation
Source: Author

Volumes

Designs are more understandable and offer more visual pleasure where the volumes of the major spaces are coherent and consistent with the external form of the building (Newman, 1972, 1973, 1996; Somerville, 1992; Passini et al., 1998; Tuan, 1974, 1975, 1977).

Internal Connections

Internal visual connections can offer similar attributes to outside views. It is therefore important to appraise views within the building. One of the most satisfying experiences for users is where transparency provides interesting views within the building, over long distances and conceivably through a number of spaces (Lawton, 2001; Newman, 1972, 1973, 1996; Nezlek et al., 1994, 2002; Torrington, 2007; Ulrich, 1984), as shown in Figure 4.23. The summary of the Communal Spaces category is shown in the Table 4.17 below.

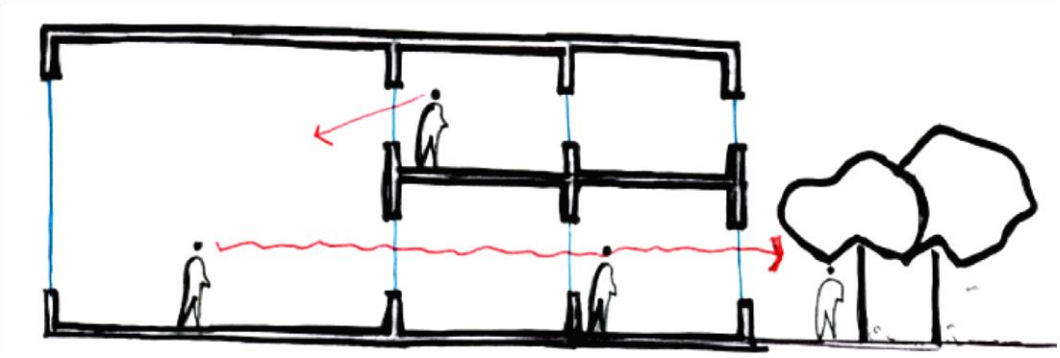


Figure 4.23: Transparency through the building to facilitate visual interest
Source: Author

Table 4.17: Shows the Communal Spaces category, with the sub-headings, together with criteria for each statement

5.00 Communal Spaces			
Ref.	Sub-headings	Criteria	
5.01	**Arrangement** (Altman,1975, 1976, 1977; Barnes, 2002; Lawton, 2001; Lawton et al., 2000; Altman and Low, 1992; Nezlek et al., 1994; 2002; Norberg-Schulz, 1965, 1971,1979; Parker et al., 2004; Porteous, 1976; Saunders and Williams,1988; Tognoli, 1987)	1	Grouping of the communal spaces as an overall strategy
	(Canter, 1977a; Lawton ,1982; Torrington, 1996)	2	Travel distance between apartments and communal spaces are minimised in line with output specification
	(Altman,1976; Barnes, 2002; Gesler, 1991, 1992, 1996; Kearns and Gesler, 1998; Lawton,1990; Nezlek et al., 1994, , 2002; Nezlek ,2001 Torrington, 1996)	3	There is access to external spaces while maintaining security
5.02	**Communal lounges and subspaces** (Lawton, 2001; Torrington, 1996)	1	Ratio of users to communal space; total area of lounges a minimum of $2m^2$ per apartment and appropriately distributed throughout the scheme
	(Altman,1975, 1976; Barnes, 2002; Douglas, 1991; Newell, 1994, 1995; Nezlek et al., 1994, 2002; Parker et al., 2004; Proshansky et al., 1970; Saunders and Williams,1988; Somerville, 1997; Werner et al., 1985)	2	Variety of lounge spaces for different types of activity provided, e.g. quiet and active
	(Lawrence, 1987b; Lawton, 2001; Nezlek et al., 1994, 2002; Torrington, 1996)	3	Communal lounges and subspaces are sufficiently adaptable for change of use and user capacity
	(Barnes, 2006; Lawton, 2001; Proshansky et al., 1970; Relph, 1976)	4	A sufficient number and size of communal subspaces are provided
	(Barnes, 2006; Lawrence, 1987a; Nezlek et al., 1994, 2002; Passini et al., 1998, 2000)	5	Communal space and subspaces are logically arranged
	(Alexander et al., 1977a; Torrington, 1996)	6	There is sufficient and appropriately located storage arrangements
5.03	**Composition** (Lawson, 2003, 2005; Lawton et al., 2000; Relph, 1976; Somerville,1992; Tuan, 1974, 1975, 1977)	1	Varied volumes are offered to create spatial variety
	(Canter and Canter, 1979; Tuan, 1974, 1975, 1977; Ulrich, 1984)	2	Communal spaces maximise views, natural light and solar gain

5.00 Communal Spaces			
Ref.	Sub-headings	Criteria	
	(Altman,1975, 1976; Barnes, 2002; Douglas, 1991; Douglas and Douglas, 2005; Dovey, 1985; Dupuis and Thorns, 1996; Feldman, 1996; Giuliani and Feldman, 1993; Gurney, 1997; 2000; Hay, 1990; Nezlek et al., 1994, 2002; Porteous, 1976; Rowles, 1983; Saunders and Williams,1988; Somerville, 1997)	3	Communal spaces encourage local community integration, and use by family and friends
	(Relph, 1976; Rowles, 1983; Somerville, 1992; Torrington, 2007; Tuan, 1974, 1975, 1977, 2001; Werner et al., 1985)	4	Focal points such as fireplaces or attractive bays windows are incorporated into the design of the communal spaces
5.04	**Amenities** (Alexander et al., 1977a; Day, 2004; Torrington, 2004)	1	Grouping of activities within the building and the reflection of these activities to the external
	(Barnes, 2002; Dupuis and Thorns, 1996; Feldman, 1996; Giuliani and Feldman, 1993; Lawson et al, 2003; Nezlek et al., 1994, 2002; Porteous, 1976; Relph, 1976; Saunders and Williams,1988; Sixsmith, 1992; Sixsmith and Sixsmith, 1991; Somerville,1992)	2	Encourage local community integration
	(Alexander et al., 1977a; Torrington, 1996)	3	Realistic assessment of adaptable change of use specific to each space
5.05	**Volumes** (Newman, 1972, 1973, 1996; Somerville,1992; Passini et al., 1998; Tuan, 1974, 1975, 1977)	1	Major communal interior spaces are reflected in the reading of the external form
5.06	Internal connections (Lawton, 2001; Newman, 1972, 1973, 1996; Nezlek et al., 1994, 2002; Torrington, 2007; Ulrich, 1984)	1	Views provided to enhance visual connection between other communal spaces

4.2.6 **Service Spaces**

The issues in the Service Spaces category are defined as laundry, buggy stores, bin stores, refuse strategy, plant rooms and service ducts, and ancillary storage.

Laundry

This statement notes that the laundry areas should be well located, suitably sized, minimise users' travel distances and have a logical connection to an

outside drying area. This presents five associated themes. Firstly, the communal laundry should be located to maximise accessibility and use. All washing/drying machines provided in the laundry should be so located to assist people using wheelchairs (Torrington, 1996, 2007; Werner et al., 1985). Secondly, its size should be appropriate (Torrington, 2004). The third theme is that travel distances to the laundry should not be excessive (Douglas, 1991; Lawton, 1987; Torrington, 1996, 2007). The fourth relates to the provision of a secure link from the laundry to a suitable hard-paved drying area with firm and level access. The design should also consider the relationships with other external spaces (Day, 2002; Dovey, 1985; Werner et al., 1985). Outdoor drying should not impact on the use and experience of any another external area. Lastly, the outdoor drying space should be of an appropriate size (Torrington, 2004).

Buggy Stores

Buggy stores should be secure, well located and suitably sized. Therefore, the location of the buggy and cycle stores should enhance the safety of residents getting into and out of the building. The first point is that buggy stores should be appropriately located near to the main entrance and should have a clear access strategy (Alexander et al., 1977a; Passini et al., 1998, 2000). Secondly, the security strategies should be appropriate with external access to a buggy store, and further progression into the building (Torrington, 1996, 2007). Thirdly, the design should incorporate appropriately sized buggy stores (Torrington, 2004). Consideration should be given to the manoeuvrability of buggies within the stores. Fourthly, charging points should be provided for buggies and should be appropriately located (Lawton, 1985; 1987; Torrington, 2004). Finally, the provision of the cycle storage should be user-friendly, fit for purpose, accessible and durable, and the overall appearance should be in keeping with the whole scheme (Alexander et al., 1977a; Torrington, 2004).

Bin Stores

Attention should be given to internal refuse provision, which should be appropriately located and suitably sized (Alexander et al., 1977a; Day, 2002).

The first theme is that refuse stores should be designed along an external wall to ensure efficient ventilation through a vented door to minimise smells, thus avoiding the need for mechanical systems. Refuse stores should be of an appropriate size and could be provided for each floor to hold one week's worth of waste (Torrington, 1996, 2007). There should be a clear demonstration of the number, capacity, area and manoeuvrability of bins within the stores. Finally, internal refuse stores on all levels should be located so that residents have minimal distances to walk from their apartments to dispose of their waste (Douglas, 1991; Lawton, 1985, 1987; Torrington, 1996, 2007).

Refuse Strategy

The waste disposal route should be segregated from social and communal spaces (Alexander et al., 1977a; Torrington, 2004). This requirement is essentially the statement and the first theme. Secondly, there should be a designated and logical transfer route from internally collected waste to the external collection point (Lawton, 1982, 1985, 1987). The external refuse store should also be easily accessible and its relationship to the internal stores, they should cause minimal effect on residents and neighbours at times of collection. Third, the location and design of the external refuse collection area should be non-intrusive and should be integrated into the surrounding landscape (Alexander et al., 1977a; Torrington, 2004). Fourthly, design should be adaptable, to maximise opportunity for future recycling demands (Alexander et al., 1977a; Torrington, 2004); and finally, the approach and circulation for goods and refuse vehicles should also be clear and if possible should be segregated from public access (Alexander et al., 1977a).

Plant Rooms and Service Ducts

These should be appropriately located with external access that should be segregated from internal areas for servicing, maintenance and deliveries (Alexander et al., 1977a; Torrington, 2004). Plant rooms and service ducts should cause minimal disruption to residents, users and neighbours

(Torrington, 2004). Further, there should be provision of an appropriately located and sized communications room (Mallett, 2004).

Ancillary Storage

The cleaners' stores should be appropriately sized and located (Alexander et al., 1977a; Torrington, 2004). Secondly, storage areas should be conveniently located for staff and consideration must be given to manoeuvrability of bulky equipment. Storage access that interferes with residents' movement along circulation spaces or disturbs communal areas should be avoided (Alexander et al., 1977a; Torrington, 2004). . The summary of the Service Spaces category is shown in the Table 4.18 below.

Table 4.18: Shows the Service Spaces category, sub-headings together with criteria for each statement

6.00 Service Spaces			
Ref.	Sub-headings	Criteria	
6.01	**Laundry** (Torrington, 1996, 2007; Werner et al., 1985)	1	Location in terms of accessibility, use and security
	(Torrington, 2004)	2	Appropriate size of laundry room
	(Douglas, 1991; Lawton, 1987; Torrington, 1996, 2007)	3	Travel distances should not be excessive
	(Day, 2002; Dovey, 1985; Werner et al., 1985)	4	Connection to a secure outdoor drying space and location in relation to the overall external space
	(Torrington, 2004)	5	Appropriately sized outdoor drying space. The layout demonstrates permanent fixings and capacity of drying line
6.02	**Buggy stores** (Alexander et al., 1977a; Passini et al., 1998, 2000)	1	Near the main entrance and has a clear access strategy
	(Torrington, 1996, 2007)	2	Security strategies are appropriate: external access to buggy store, and progression into the building
	(Torrington, 2004)	3	Appropriately sized buggy store provided and adequate manoeuvrability of buggies demonstrated. Easily adaptable to future needs
	(Lawton, 1985, 1987; Torrington, 2004)	4	Charging points for buggies are well distributed within the buggy store

6.00 Service Spaces			
Ref.	Sub-headings	Criteria	
	(Alexander et al., 1977a; Torrington, 2004)	5	Cycle storage provision is user-friendly, fit for purpose, accessible, durable and appearance is in keeping with scheme
6.03	**Bin stores** (Alexander et al., 1977a; Day, 2002)	1	Internal refuse stores are located on external walls with vents to ensure efficient ventilation to minimise smell
	(Torrington, 1996; 2007)	2	Appropriate size of refuse stores has been provided for each floor to meet councils' waste management requirements. The capacity, number, area and manoeuvrability of bins are clearly demonstrated
	(Douglas, 1991; Lawton, 1985, 1987; Torrington, 1996, 2007)	3	Travel distances to stores from apartments should not be excessive
6.04	**Refuse strategy** (Alexander et al., 1977a; Torrington, 2004)	1	Refuse stores are segregated from social and communal spaces
	(Lawton ,1982, 1985, 1987)	2	Designated route for removal of waste from internal stores to the external collection point, minimising travel distance from a suitable building exit
	(Alexander et al., 1977a; Torrington, 2004)	3	Refuse storage has non-intrusive integration with the surrounding landscaping
	(Alexander et al., 1977a; Torrington, 2004)	4	Adaptable to maximise opportunity for future recycling demands
	(Alexander et al., 1977a)	5	Approach and circulation for goods and refuse vehicles is clear and if possible is segregated from public access
6.05	**Plant rooms and service ducts** (Alexander et al., 1977a; Torrington, 2004)	1	External access for servicing, maintenance and deliveries which is segregated from internal areas
	(Torrington, 2004)	2	The location of plant rooms and service ducts cause minimal disruption to residents, users and neighbours
	(Mallett, 2004)	3	Provision of an appropriately located and sized communications room
6.06	**Ancillary storage** (Alexander et al., 1977a; Torrington, 2004)	1	Provision of appropriately sized storage with fixtures and fittings where appropriate
	(Alexander et al., 1977a; Torrington, 2004)	2	Location, size and distribution are useful to staff, but minimise adverse effects on the residents

4.2.7 **Circulation Spaces**

The elements in circulation spaces are corridors, lifts, and staircases.

Corridors

A design should consider good use of natural daylight and solar gain, and offer views from circulation space. Natural daylight is considered to assist health and well-being, making spaces more welcoming and convivial (Ulrich, 1984). Corridors reliant on artificial light can be dull and may be confusing for some residents. Natural daylight could be brought into a space by a number of methods such as windows, skylights and light wells. Windows provide views that can allow users to orientate themselves by association with a particular route and area of the building (Douglas and Douglas, 2005). Consideration should be given to the provision of windows and the transparency of circulation spaces, including methods of borrowing light between corridors and communal spaces (Newman, 1972, 1973, 1996). Good daylight and views are therefore the first theme in this section.

The circulation spaces should be designed as the same way as habitable spaces; excessive long sterile corridors should be avoided (see Figure 4.24) (Barnes, 2002; Douglas, 1991; Lawton, 1985, 1987). Thus, theme two states that a proposed building should have circulation spaces of minimal length and avoid dead ends. The design strategy should use space as a resource, and dual use of circulation space should be explored so that routes have other functional uses. Interesting, flexible casual sitting and gathering spaces should be encouraged within the circulation to allow users to utilise the space for socialising and rest if needed (Barnes, 2002; Douglas, 1991; Lawton, 1985, 1987). The spaces should be active while maintaining privacy to apartments (Alexander, 1979; Altman, 1976; Lawton, 1985, 1987; Nezlek et al., 1994, 2002; Nezlek, 2001; Nezlek and Reis, 1999; Rapoport, 1988; Relph, 1976; Werner et al., 1985), as noted in the third theme.

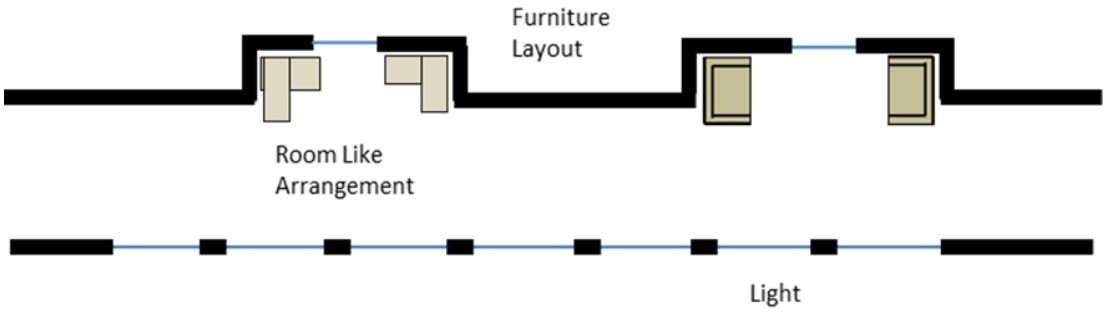


Figure 4.24: Casual sitting and gathering spaces should be encouraged within the circulation
Source: Author

Accessible corridors for buggy and wheelchair use are requirements for a scheme. However, the design should ensure that circulation space does not compromise usable space that could be incorporated into other activities (Alexander, 1979; Barnes, 2002). So, the fourth theme relates to a high ratio of usable area to gross floor area. The design of circulation space should primarily promote a homely atmosphere (Buttimer, 1980; Buttimer and Seamon,1980; Canter, 1977a and b, 1983; Dovey, 1978; Hayward, 1977; Sixsmith, 1986; Somerville, 1992; 1997; Torrington, 1996, 2007), which is the fifth theme. The sixth is that a scheme should incorporate clear circulation patterns and design features to aid orientation and way-finding, with consideration given to access points and where there are changes in direction (Lawton, 2001; Lawton et al., 2000; Passini et al., 1998, 2000). Finally, colour and contrast should be used to avoid monotonous routes. Artwork should also be incorporated at key areas of the circulation space (Despres, 1991a and b; Newman, 1972, 1973, 1996; Rowles, 1983; Ulrich et al., 1991).

Lifts

The statement points out that lifts should be well distributed and located so that travel distances to apartments are minimised. Theme one states that lifts should not have adverse effects on communal spaces, apartments, and the overall comfort of residents from noise and vibration, i.e. noise from lift mechanisms as well as noise generated from users while waiting around the lift (Lawton, 1982, 1985, 1987; Passini et al., 1998, 2000). Secondly, the

maintenance should be easily achieved without causing disturbance to residents (Norberg-Schulz, 1965; Torrington, 2004). The third theme is that lifts should be located to minimise travel distances for users (Douglas, 1991; Lawton, 1982, 1985, 1987). Finally, there should be an appropriate ratio of lifts to the number of users (Torrington, 2004).

Staircases

The location of staircases should also have no adverse effects on communal spaces, apartments or the overall comfort of residents in terms of noise and vibrations (Lawson, 2001; Passini et al., 1998, 2000). Secondly, staircases should be located in appropriate areas to minimise travel distances to apartments (Douglas, 1991; Lawton, 1982, 1985; 1987). Thirdly, their purpose should be defined and clear, and they should be easy to use (Alexander et al., 1977a; Passini, et al., 1998). The location and arrangement of staircases should engage with adjacent areas (Day, 2004; Nezlek et al., 1994, 2002). In particular, stairs should be easily identifiable from communal spaces and should be well illuminated (Alexander et al., 1977a). . The summary of the Circulation Spaces category is shown in the Table 4.19 below.

Table 4.19: Shows the Circulation Spaces category, sub-headings together with criteria for each statement

7.00 Circulation Spaces			
Ref.	Sub-headings	Criteria	
7.01	**Corridors** (Douglas and Douglas, 2005; Newman, 1972, 1973, 1996; Ulrich, 1984)	1	Good daylight, solar gain and views within the circulation space
	(Barnes, 2002; Douglas, 1991; Lawton, 1985, 1987)	2	Minimise length of circulation spaces and avoid dead ends
	(Alexander, 1979; Altman, 1976; Lawton, 1985, 1987; Nezlek et al., 1994, 2002; Nezlek, 2001; Nezlek and Reis, 1999; Rapoport, 1988; Relph, 1976; Werner et al., 1985)	3	Circulation spaces are designed to encourage informal activities other than just movement. Casual sitting areas that are usable, and not adjacent to sources of noise or invade on personal privacy of residents apartments
	(Alexander, 1979; Barnes, 2002)	4	Efficient provision of circulation space (provision of high ratio of usable area to gross built area)

7.00 Circulation Spaces			
Ref.	Sub-headings	Criteria	
	(Alexander, 1979; Buttimer,1980; Buttimer and Seamon,1980; Canter, 1977a & b, 1983; Dovey, 1978; Hayward, 1977; Sixsmith, 1986; Somerville, 1992; 1997; Torrington, 1996, 2007)	5	Design promotes a homely environment
	(Lawton, 2001; Lawton et al., 2000; Passini et al., 1998, 2000)	6	Clear circulation pattern and features to key access points and change in direction to aid orientation
	(Despres, 1991a & b; Newman, 1972, 1973, 1996; Rowles, 1983; Ulrich et al., 1991)	7	Use of decoration, artwork and view to create variety within the circulation spaces
7.02	**Lifts** (Lawton, 1982, 1985, 1987; Passini et al., 1998, 2000)	1	Location of lifts do not have adverse effects on communal spaces, apartments and the overall comfort of residents in terms of mechanical noise and vibrations or noise from people gathered around lifts
	(Norberg-Schulz, 1965; Torrington, 2004)	2	Maintenance can be easily achieved without causing disturbance to residents
	(Douglas, 1991; Lawton ,1982, 1985, 1987)	3	Minimal travel distances from the lift to the apartment
	(Torrington, 2004)	4	Relative number of lifts to users based on lift traffic analysis
7.03	**Staircases** (Lawson, 2001; Passini et al., 1998, 2000)	1	Location of staircases do not have adverse effects on communal spaces, apartments and the overall comfort of residents in terms of noise from people on stairways is considered
	(Douglas, 1991; Lawton ,1982, 1985, 1987)	2	Minimal travel distances from the staircase to the apartment
	(Alexander et al., 1977a; Passini et al., 1998)	3	Purpose is defined, clear and easy to use
	(Alexander et al., 1977a; Day, 2004; Nezlek et al., 1994, 2002)	4	Staircases engage with adjacent areas

4.2.8 **Apartments**

The issues within the Apartments category are defined as number of apartments, layouts, use of space, adaptability, daylighting, acoustics, storage, and apartment entrance.

Number of Apartments

The overall number and size of apartments within the scheme should meet the requirements as identified in the output specification (see Figure 3.4).

There is an option for bidders to exceed the number specified. In case of refurbishment scheme, any additional apartment must be equal to or be greater than the size of the existing apartment (Buttimer, 1980; Buttimer and Seamon, 1980; Chapman and Hockey, 1999; Rivlin, 1990, 1996). Secondly, the ratio of one- to two-bedroom apartments should be as specified. The number of two-bedroom apartments should also meet the requirements (Torrington, 2004).

Layouts

The first theme is that the layout of each individual apartment should be simple. Complex layouts could cause confusion and should be avoided (Altman, 1976; Altman and Werner, 1985; Heidegger, 1971, 1977, 1993; Horwitz and Tognoli, 1982; Lawton, 1990; 1998; Massey, 1992; Moore, 1998; Moore and Canter,1991, 1993; Moore et al., 1995; Porteous and Smith, 2001). Secondly, the size and proportion of each apartment space should meet good practice standards for room areas and widths. Specifically, this applies to: the living space, kitchen, main (double) bedroom, second (single) bedroom and bathroom (Cooper, 1976, 1995; Douglas, 1991; Lawton, 1982; Parker et al., 2004, Torrington, 2007).

Use of Space

Rooms should be spatially arranged to avoid obstructed progression through spaces (Altman, 1976; Benjamin, 1995b; Canter, 1997; Parker et al., 2004; Relph, 1976). Secondly, internal doors to the apartments should also be logically arranged to provide short and simple walking distances between spaces. Good practice is to arrange direct access to the lounge from the hallway and the kitchen (Alexander et al., 1977a; Lawton, 1982; Parker et al., 2004). Thirdly, all areas should be accessible, particularly for wheelchair and walking frame users. Provision should be made for turning circles. Furthermore, the design should demonstrate consideration for people with physical disabilities and visual impairments (Canter, 1977a; Cooper, 1976; Douglas, 1991; Lawton, 1990, 1998; Parker et al., 2004).

Adaptability

Flexibility should be provided in the design of the second bedroom, so that it can be converted for different uses, e.g. office or library, with access from either the hall or lounge (Appleyard, 1979; Cooper, 1976; Douglas and Douglas, 2005; Lawton, 1985; 1987; Smith, 1994).

Daylighting

The statement notes that apartments should be oriented and configured to maximise daylight, enhance views and where possible allow access to (private) external spaces (see Figures 4.25 and 4.26). Thus the first theme is that north- facing apartments should be avoided (Douglas and Douglas, 2005; Ulrich et al., 1991). Secondly, apartments should provide access to external spaces for natural light, while retaining security (Alexander, 1979; Despres, 1991a and b; Douglas and Douglas, 2005; Dovey, 1985; Newman, 1972, 1973, 1996; Parker et al., 2004; Torrington, 2007; Ulrich et al., 1991).

Figure 4.25: Private patio designed as a partially enclosed space
Source: https://a1.muscache.com/pictures/29766182/large.jpg

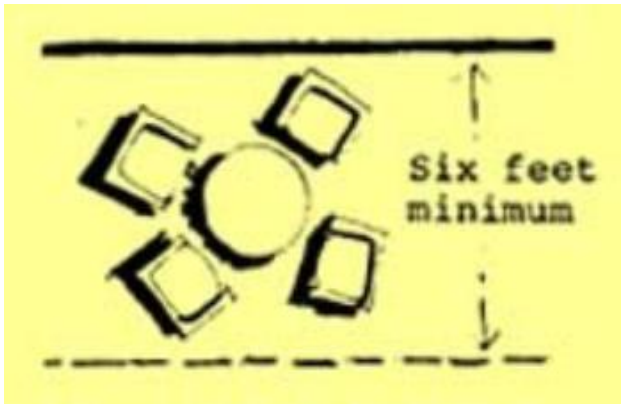


Figure 4.26: Various layouts for balcony provision forming stronger connection to the building

Source: (Hertzberger, 1998; https://a1.muscache.com/pictures/23920178/large.jpg).

Acoustics

According to the statement, apartments should be arranged to maximise acoustic comfort and resist the passage of noise and unwanted sounds. Therefore the theme is that the arrangement should avoid adjacencies of noise-sensitive spaces to neighbours, services and lifts. Where adjacencies of services and apartments cannot be avoided and where room adjacencies between apartments are not ideal, materials should be used that minimise sound transmission (Alexander et al., 1977a; Lawton, 1982, 1985; Newell, 1994).

Storage

The overarching requirement is that storage should be in appropriate locations and of adequate provision. Thus the first theme is that built-in storage should be provided within the apartments, while deep and inaccessible storage should be avoided to present an ergonomic design for older people (Day, 2002; Lawton, 1982, 1985; Oswald and Wahl, 2005). Secondly, appropriately sized storage should be provided for general use (Alexander et al., 1977a; Torrington, 2004). Alternatively, this could be provided within a communal area.

Apartment Entrance

The entrance to each apartment should be attractive, welcoming and able to be personalised to the resident's taste. The first theme is that techniques to identify individual apartments should be used, such as recessing the entrance, which would also offer variety to the circulation spaces (Altman and Low, 1992; Altman and Werner, 1985; Buttimer, 1980; Cooper, 1974, 1995; Gurney, 2000; Marcus, 1995; Proshansky, 1978; Proshansky et al., 1983; Rubinstein, 1989, 1990, 1993; Rubinstein and de Medeiros, 2004, 2005; Rubinstein and Parmelee, 1992; Sixsmith, 1986). Secondly, connectivity and visibility between the apartment and the circulation route could be achieved with transparent elements. Residents need to be able to identify visitors (Altman, 1976; Hayward, 1975; Newman, 1972, 1973, 1996; Saunders, 1989, 1990). Thirdly, finishes and decor should provide a homely feeling to the entrance area (Altman and Werner, 1985; Canter, 1983; Cooper, 1974, 1995; Dovey, 1985; Giuliani, 1991; Hay, 1998a and b; Moore, 1998; Relph, 1976; Rowles, 1983; Rubinstein, 1989, 1990, 1993; Rubinstein and de Medeiros, 2004, 2005; Rubinstein and Parmelee, 1992).

Figure 4.27: Examples of the entrance room

Source: http://cdn.homedit.com/wp-content/uploads/2013/03/hallway-design.jpg

See Table 4.20 that summarise the Apartments category, with the sub-headings, together with criteria for each statement.

Table 4.20: Shows the Apartments category, sub-headings together with criteria for each statement

8.00 Apartments			
Ref.	Sub-headings	Criteria	
8.01	**Number of apartments** (Buttimer, 1980; Buttimer and Seamon, 1980; Chapman and Hockey, 1999; Rivlin, 1990, 1996)	1	The overall number and size of apartments within the scheme meet or exceed council requirements
	(Torrington, 2004)	2	The number of 2-bed apartments meets council requirements. Percentage of 2-bed apartments to be stated

8.00 Apartments			
Ref.	Sub-headings	Criteria	
8.02	**Layouts** (Altman, 1976; Altman and Werner, 1985; Heidegger, 1971, 1977, 1993; Horwitz and Tognoli, 1982; Lawton, 1990; 1998; Massey, 1992; Moore, 1998; Moore and Canter,1991, 1993; Moore et al., 1995; Porteous and Smith, 2001)	1	Individual apartments have simple layouts that is light and planned to make the most of the available space
	(Cooper, 1976, 1995; Douglas, 1991; Lawton, 1982; Parker et al., 2004, Torrington, 2007)	2	The size and proportion of each apartment space meet practice standards for room areas and widths (a) Living space (b) Kitchen (c) Main bedroom (d) Single bedroom (e) Bathroom
8.03	**Use of space** (Altman, 1976; Benjamin, 1995b; Canter, 1997; Parker et al., 2004; Relph, 1976)	1	Clear sequence and progression between spaces. Direct access from lounge to hallway and kitchen required
	(Alexander et al., 1977a; Lawton, 1982; Parker et al., 2004)	2	Internal apartment doors are arranged for minimal walking distances between spaces
	(Canter, 1977a; Cooper, 1976; Douglas, 1991; Lawton,1990, 1998; Parker et al., 2004)	3	Accessible for wheelchairs and use of walking frame, with appropriate turning circles
8.04	**Adaptability** (Appleyard, 1979; Cooper, 1976; Douglas and Douglas, 2005; Lawton, 1985; 1987; Smith, 1994)	1	Flexibility required in the design of the second bedroom to have a multiplicity of uses, e.g. an office, a library etc. Options should be shown for adaptability of bathrooms and kitchens
8.05	**Daylighting** (Douglas and Douglas, 2005; Ulrich et al., 1991)	1	North-facing apartments have been avoided
	(Alexander, 1979; Despres, 1991a & b; Douglas and Douglas, 2005; Dovey, 1985; Newman, 1972, 1973, 1996; Parker et al., 2004; Torrington, 2007; Ulrich et al., 1991)	2	Daylit access has been provided to an external space
8.06	**Acoustics** (Alexander et al., 1977a; Lawton, 1982, 1985; Newell, 1994)	1	Noise-sensitive spaces such as bedrooms are not located adjacent to neighbours' living spaces, services and lifts
8.07	**Storage** (Day, 2002; Lawton, 1982, 1985; Oswald and Wahl, 2005)	1	Built-in provision for storage within the apartment. Deep and inaccessible storage facilities have been avoided and ergonomically designed to suit older people
	(Alexander et al., 1977a; Torrington, 2004)	2	Appropriately sized storage has been provided for general use

8.00 Apartments			
Ref.	Sub-headings	Criteria	
8.08	**Apartment entrances** (Altman and Low, 1992; Altman and Werner, 1985; Buttimer, 1980; Cooper, 1974, 1995; Gurney, 2000; Marcus, 1995; Proshansky, 1978; Proshansky et al., 1983; Rubinstein, 1989, 1990, 1993; Rubinstein and de Medeiros, 2004, 2005; Rubinstein and Parmelee, 1992; Sixsmith, 1986)	1	Strategies to identify the entrance to individual apartments have been used, such as recessing the entrance to the apartment, reducing the linearity and monotony of circulation spaces
	(Altman,1976; Hayward, 1975; Newman, 1972, 1973, 1996; Saunders, 1989, 1990)	2	Internal and external connectivity is maximised by the use of vision panels
	(Altman and Werner, 1985; Canter, 1983; Cooper, 1974, 1995; Dovey, 1985; Giuliani, 1991; Hay, 1998a & b; Moore, 1998; Relph, 1976; Rowles, 1983; Rubinstein, 1989, 1990, 1993; Rubinstein and de Medeiros, 2004, 2005; Rubinstein and Parmelee, 1992)	3	Finishes and décor provide a homely quality to the entrance area

4.2.9 **Architectural Components**

The issues in the Architectural Components category are: building envelope; external doors and windows; internal doors; internal walls; internal finishes; lifts; staircases; apartment fixtures, fittings and equipment; communal fixtures, fittings and equipment; external works; and external lighting.

Building Envelope

The statement notes that the building structure and envelope should be appropriately designed for durability, maintenance and aesthetics. This led to three themes. First, that the structure, materials, finishes and technologies should be robust and durable. Different types of junctions and their construction details can be treated so as to overcome defects (Canter, 1977a; Douglas, 1991; Rapoport, 1980, 1995). Secondly, that the materials chosen require low maintenance and cleaning (Torrington, 2004); and thirdly, that the materials and finishes of the building envelope should be domestic in feeling and appearance (Alexander et al., 1977a; Massey, 1992; Rivlin and Moore, 2001).

External Doors and Windows

These elements have requirements for quality, style and appearance. The first theme is that windows and doors to residential areas should be easy to reach, access, operate, are durable and low maintenance (Oswald and Wahl, 2005; Torrington, 2004). Secondly, they should be ergonomically designed for older people and those with physical disabilities and impairments (Oswald and Wahl, 2005; Torrington, 2004); and thirdly that they should have a domestic feeling and appearance (Alexander et al., 1977a; Massey, 1992; Rivlin and Moore, 2001).

Internal Doors

The internal doors to residential areas should be easy to operate, durable, and low maintenance (Oswald and Wahl, 2005). They should be also be ergonomically designed for older people and those with physical disabilities and impairments (Oswald and Wahl, 2005; Torrington, 2004). Finally, they should also be domestic in feeling and appearance (Mallett, 2003, 2004).

Internal Walls

This sub-heading includes walls, partitions, glazed screens and ceilings. The choice of internal construction should be suitable for future adaptations to the apartments (Alexander et al., 1977a; Torrington, 2004). The structure, materials, finishes and technologies should be robust, durable and appropriate to the use of the particular area (Alexander et al., 1977a; Massey, 1992; Rivlin and Moore, 2001). The third theme is that, in addition, internal walls should be domestic in feeling and appearance (Massey, 1992; Rivlin and Moore, 2001; Torrington, 2004). The fourth theme is that the internal walls should resist sound transmission where necessary (Alexander et al., 1977a).

Internal Finishes

The finishes relate to walls, floors, staircases, and ceilings. Once again, these elements should be domestic in feeling and appearance (Norberg-Schulz, 1965, 1979; Massey, 1992; Rivlin and Moore, 2001). The second theme is that they should be easily maintained and durable (Torrington,

2004). A recurring theme is that consideration should be given to people with physical disabilities and visual impairments (Oswald and Wahl, 2005; Torrington, 2007). The fourth theme is that they should comply with health and safety requirements (Oswald and Wahl, 2005; Torrington, 2007); and finally, the appearance, quality, durability and maintenance of finishes in each space needs to be assessed (Torrington, 2004).

Lifts

The three themes for lifts are that they should be domestic in feeling and appearance (Alexander et al., 1977a, Massey, 1992; Rivlin and Moore, 2001); that the materials and finishes are robust, durable and easily cleaned (Dupuis and Thorns, 1998; Gurney, 2000; Saunders and Williams, 1988; Somerville, 1997); and that consideration is given to people with physical and mental disabilities and visual impairments (Oswald and Wahl, 2005; Torrington, 2004).

Staircases

This sub-heading has four themes. First, as included under a number of sub-headings, they should also be domestic in feeling and appearance (Alexander et al., 1977a; Massey, 1992; Rivlin and Moore, 2001). Secondly, the structure, materials, finishes and technologies should be robust and durable (Dupuis and Thorns, 1998; Gurney, 2000; Saunders and Williams, 1988; Somerville, 1997). Thirdly, the materials and level of detail should be specific to the use and location (Alexander et al., 1977a). In addition, consideration should be given to minimising unused space under the stairs (Massey, 1992; Rivlin and Moore, 2001; Torrington, 2004).

Apartment Fixtures, Fittings and Equipment

Sanitaryware, kitchen fittings and electrical installations should be designed to be user-friendly, durable and of appropriate finish. This is achieved with exactly the same three criteria as for the lifts sub-heading (Alexander et al., 1977a, Massey, 1992; Oswald and Wahl, 2005; Rivlin and Moore, 2001; Torrington, 2004).

Communal Fixtures, Fittings and Equipment

Sanitaryware, kitchen fittings, electrical installations, loose and soft furnishings (including blinds), equipment and white goods should also satisfy these three criteria (Alexander et al., 1977a, Massey, 1992; Oswald and Wahl, 2005; Rivlin and Moore, 2001; Torrington, 2004).

External Works

This sub-heading covers street and garden fittings and furniture. The themes are similar. The first one is that they should have a homely and inviting feeling and appearance (Massey, 1992; Rivlin and Moore, 2001, Torrington, 2004). Secondly, the materials and finishes should be durable and fit for purpose (Alexander, 2002; Oswald and Wahl, 2995; Torrington, 2004). Thirdly, consideration should be given to people with visual impairments and physical or mental disabilities (Oswald and Wahl, 2005; Torrington, 2004), and finally that there is sufficient provision for the number of residents and visitors (Barnes et al., 2011).

External Works – Lighting

There are two themes under this sub-heading. Theme one is that the exterior lighting systems should be domestic in feeling and appearance where appropriate (Alexander et al., 1977a; Massey, 1992; Rivlin and Moore, 2001); and theme two is that the selection of lighting is suitable for use and location (Oswald and Wahl, 2005; Torrington, 2007). See Table 4.21 that summarise the Architectural Components category, with the sub-headings, together with criteria for each statement.

Table 4.21: Architectural Components category, sub-headings and criteria

9.00 Architectural Components			
Ref.	Sub-headings	Criteria	
9.01	**Building envelope** (Canter, 1977a; Douglas, 1991; Rapoport, 1980, 1995)	1	Structure, materials, finishes and technologies are robust and durable. Different types of junctions and their construction details have been treated to overcome defects
	(Torrington, 2004)	2	Require low maintenance and cleaning

9.00 Architectural Components			
Ref.	Sub-headings	Criteria	
	(Alexander et al., 1977a; Massey, 1992; Rivlin and Moore, 2001)	3	Domestic in feeling and appearance
9.02	**External doors and windows** (Oswald and Wahl, 2005; Torrington, 2004)	1	Easy to operate, durable, and low maintenance
	(Oswald and Wahl, 2005; Torrington, 2004)	2	Ergonomically designed for elderly people and those with physical disabilities and impairment
	(Alexander et al., 1977a; Massey, 1992; Rivlin and Moore, 2001)	3	Domestic in feeling and appearance
9.03	**Internal doors** (Oswald and Wahl, 2005)	1	Easy to operate, durable, and low maintenance
	(Oswald and Wahl, 2005; Torrington, 2004)	2	Ergonomically designed for elderly people and those with physical disabilities and impairment
	(Mallett, 2003, 2004)	3	Domestic in feeling and appearance
9.04	**Internal walls** (Alexander et al., 1977a; Torrington, 2004)	1	Suitable for future adaptation of apartment
	(Alexander et al., 1977a;Massey, 1992;Rivlin and Moore, 2001)	2	Structure, materials, finishes and technologies are robust and durable and appropriate to use of area
	(Massey, 1992; Rivlin and Moore, 2001; Torrington, 2004)	3	Domestic in feeling and appearance
	(Alexander et al., 1977a)	4	Resist sound transmission in sensitive locations
9.05	**Internal finishes** (Norberg-Schulz, 1965, 1979; Massey, 1992; Rivlin and Moore, 2001)	1	Domestic in feeling and appearance
	(Torrington, 2004)	2	Easily maintained and durable
	(Oswald and Wahl, 2005; Torrington, 2007)	3	Appropriate for physical and mental disabilities and visual impairments
	(Oswald and Wahl, 2005) (Torrington, 2007)	4	Comply with health and safety requirements
	(Torrington, 2004)	5	Appropriate to each space in terms of appearance, quality, durability and maintenance
9.06	**Lifts** (Alexander et al., 1977a; Massey, 1992; Rivlin and Moore, 2001)	1	Domestic in feeling and appearance
	(Dupuis and Thorns, 1998; Gurney, 2000; Saunders and Williams,1988; Somerville, 1997)	2	Materials and finishes are robust and durable

9.00 Architectural Components			
Ref.	Sub-headings	Criteria	
	(Oswald and Wahl, 2005; Torrington, 2004)	3	Appropriate for physical and mental disabilities and visual impairments
9.07	**Staircases** (Alexander et al., 1977a; Massey, 1992; Rivlin and Moore, 2001)	1	Domestic in feeling and appearance
	(Dupuis and Thorns, 1998; Gurney, 2000; Saunders and Williams,1988; Somerville, 1997)	2	Structure, materials, finishes and technologies are robust and durable
	(Alexander et al., 1977a)	3	Materials and level of detail are specific to use and location
	(Massey, 1992; Rivlin and Moore, 2001; Torrington, 2004)	4	Consideration given to minimise unused space (under stairs)
9.08	**Apartment fittings and equipment** (Alexander et al., 1977a; Massey, 1992; Rivlin and Moore, 2001)	1	Domestic in feeling and appearance
	(Torrington, 2004)	2	Materials and finishes are durable and easily cleaned
	(Oswald and Wahl, 2005; Torrington, 2004)	3	Appropriate for physical and mental disabilities and visual impairments
9.09	**Communal fittings and equipment** (Alexander et al., 1977a; Massey, 1992; Rivlin and Moore, 2001)	1	Domestic in feeling and appearance
	(Oswald and Wahl, 2005; Torrington, 2004)	2	Materials and finishes are durable and easily cleaned
	(Oswald and Wahl, 2005; Torrington, 2004)	3	Appropriate for physical and mental disabilities and visual impairments
9.10	**External works** (Massey, 1992; Rivlin and Moore, 2001; Torrington, 2004)	1	Homely and inviting in feeling and appearance
	(Alexander, 2002; Oswald and Wahl, 2005; Torrington, 2004)	2	Materials and finishes are durable and fit for purpose
	(Oswald and Wahl, 2005; Torrington, 2004)	3	Appropriate for physical and mental disabilities and visual impairments
	(Barnes et al. 2011)	4	Sufficient provision for residents and visitors
9.11	**External lighting** (Alexander et al., 1977a; Massey, 1992; Rivlin and Moore, 2001)	1	Domestic in feeling and appearance where appropriate
	(Oswald and Wahl, 2005; Torrington, 2007)	2	Selection of lighting suitable for use and location

4.3 Scoring and Weighting

4.3.1 **Introduction**

One possibility for presenting schemes for evaluation is through the use of avatars – digital representation of people in simulated or virtual environments. Advances in these techniques are already occurring in a number of industries. However, there is a need to be cautious. Users can become mesmerised by computer-generated images, and this effect can greatly diminish their critical faculties (Groak, 2001). In a recent independent study by Serginson et al. (2012) on users' assessment of school design, it was concluded that the viewers' critical analysis was adversely affected by the nature of the virtual reality model and the sense of immersion using 3D glasses. Moreover, Eley (2004) states that evaluating the quality of a building design is not like assessing it in 'a marble', a dinner plate or a car. Even automobiles are far simpler than buildings, with a high proportion of characteristics that are physically measurable.

From the beginning, the importance of the amenity's attributes was emphasised. At the presentations by the independent advisers from Northumbria University in December 2008, the primary objective was to provide supplementary guidance for bidders. Councillors (including the Design Champion) and representatives of the Users' Group were also present. The presentations focused almost entirely on amenity attributes, and were based around people and places. The literature confirms that although the performance attributes need to be achieved, the real quality of the design lies in the amenity attributes (Day, 2002; Giddings and Holness, 1996). This follows the principle of the Quality Assessment Hierarchy (see Figure 2.19) in which performance cannot be neglected but criteria demonstrating greater amenity are weighted higher on a linear scale.

4.3.2 **Process for Scoring**

The process was to explore and make use of appropriate scaling methods that would assist the accuracy of evaluations. The extensive use of rating scales in market and academic research has generated huge debate over

the appropriate scale to use. The purpose of a rating scale is to allow respondents to express both the direction and strength of their judgement about a criterion. Essentially, the scale helps the individuals to make a decision on their level of agreement according to any kind of criteria. The number beside each response becomes the significance for that response and the total score may be obtained by adding the values for each response. It is identified in the literature that the most effective, simple and easy-to-use method that could be adopted is a Likert scale (e.g. Neuman, 2000; Maurer and Andrews, 2000). This was developed by Rensis Likert in 1932. This is a psychometric scale frequently used in questionnaires, and is the most extensively used scale in survey research (Sudha and Baboo, 2011). It is acknowledged in Neuman (2000) that as the number of points on the scale is increased from two up through 20, the increase in reliability is extremely fast initially. It tends to level off at about seven, and after 11, there is only a small enhancement in reliability in increasing the number of points. The five-point scale is the most common, but seven points may produce more detailed results. Various combinations of size of scale were tested with the initial stage data, and it was discovered that a seven-point scoring scale produced the most consistent results. Therefore, the quality of design response to each criterion is measured on a seven-point Likert scale (Miller and Salkind, 2002) as follows:

6 – Outstanding
5 – Excellent
4 – Very Good
3 – Good
2 – Average
1 – Minimal
---
0 – Criteria not met

In addition, the assessors are required to provide a written justification for each score.

4.3.3 **Process for Weighting**

There is also considerable debate about weighting in the literature. Sudha and Baboo (2011) state that Likert scales can be used in both assessment and weighting. The Likert scale is the most commonly used method in the social sciences, further suggesting the selection of this method. Thus, it was concluded that the criteria would be weighted on a scale of 1–5, as follows:

3–5: amenity attributes
1–3: performance attributes

It should be noted that there is a crossover at point 3, where performance meets amenity attributes. The researcher chaired a meeting of the Project Team, at which each criterion was debated and allocated a weighting according to the consensus on where the criterion is positioned on the performance–amenity continuum. As a means of checking the allocation, it was decided to produce a mean weighting for each sub-heading (see Table 4.22). The hypothesis was that categories such as context, building form and communal spaces should predominantly demonstrate amenity attributes; whereas categories such as entrances, service spaces and architectural components should predominantly represent performance attributes. Headings such as external space, circulation space and apartments present more complex balances of performance and amenity criteria. This hypothesis was supported by the mean weighting calculation and therefore the proposed weightings were accepted.

Table 4.22: Mean weighting for each sub-heading

1.00 Context		
Statement Headings	**Number of Criteria**	**Mean Weighting**
Sense of place	3	4.33
Local pattern of development	4	4.25
Local landscape	1	4.00
Integration	2	3.50

2.00 External Space		
Statement Headings	**Number of Criteria**	**Mean Weighting**
Landscaping	10	3.40
Parking	6	2.33
Boundary treatment	4	2.00

3.00 Building Form		
Statement Headings	**Number of Criteria**	**Mean Weighting**
Building scale	3	4.00
Elevations	1	4.00
Definition	1	5.00
Variety	2	3.50

4.00 Entrances		
Statement Headings	**Number of Criteria**	**Mean Weighting**
Positioning	3	2.66
Definition and shelter	2	2.50
Natural surveillance	4	2.50
Internal character	2	3.50
Hierarchy of space	2	2.50
Other entrances	3	2.33

5.00 Communal Spaces		
Statement Headings	**Number of Criteria**	**Mean Weighting**
Arrangement	3	3.00
Communal lounges and subspaces	6	4.83
Composition	4	4.50
Amenities	3	5.33
Volumes	1	4.00
Internal connections	1	4.00

6.00 Service Spaces		
Statement Headings	**Number of Criteria**	**Mean Weighting**
Laundry	5	1.60
Buggy stores	5	1.20
Bin stores	3	2.33
Refuse strategy	5	3.00
Plant rooms and service ducts	3	1.66
Ancillary storage	2	1.50

7.00 Circulation Spaces		
Statement Headings	**Number of Criteria**	**Mean Weighting**
Corridors	7	3.14
Lifts	4	2.75
Staircases	4	2.75

8.00 Apartments		
Statement Headings	**Number of Criteria**	**Mean Weighting**
Number of apartments	2	2.00
Layouts	2	3.00
Use of space	3	3.00
Adaptability	1	3.00
Daylighting	2	3.50
Acoustics	1	3.00
Storage	2	2.50
Apartment entrance	3	3.66

Table 4.22 (continued)

9.00 Architectural Components		
Statement Headings	**Number of Criteria**	**Mean Weighting**
Building envelope	3	2.00
External doors and windows	3	2.00
Internal doors	3	2.00
Internal walls	4	2.00
Internal finishes	5	2.00
Lifts	3	2.00
Staircases	4	2.00
Apartment fittings and equipment	3	2.00
Communal fittings and equipment	3	2.00
External works	4	2.00
External lighting	2	2.00

A weighting percentage was also allocated to each category heading within the Tool. The percentage allocation to each category was determined by the Project Team in consultation with the Users' Group (see Table 5.2). It was decided that the percentages should vary between new build and refurbishment schemes, to reflect the scope of each type of scheme. It was also recognised that in subsequent projects, the stakeholders may wish to re-allocate the percentages in accordance with their own priorities. So, the percentages will not be written into the Tool but allocated by the team engaged on each PFI project.

4.3.4 Combination of Scoring and Weighting

This method of identifying desirable attributes, weighting them, assessing each attribute and then combining the ratings to provide an overall evaluation has its roots in utility theory and is used in a number of contexts. This approach is a sub-discipline of operations research and is termed as multi-criteria analysis (MCA).There is no normative model of how individuals should make multi-criteria choices that is without criticism. The one that comes closest to universal acceptance is based on multi-attribute utility theory (MAUT) and is derived from the work of von Neumann and Morgenstern (1947) and Savage (1954). The main role of this technique is to handle large quantities of complex information in a consistent way. A key feature is its emphasis on the judgement of the decision-making team – in establishing objectives and criteria, assessing the relative importance of criteria through an explicit weighting system, and evaluating the contribution

of responses to each criterion (Keeney and Raiffa, 1993; Brugha, 1998; Wallenius et al., 2008). The most common way to combine scores on criteria is to calculate a simple weighted average (Department for Communities and Local Government, 2009). A notable aspect of multiplying scores and weighting is that the weighting should generate sufficient differential in the overall scores, without making the differential so great that the results would be skewed. Sudha and Baboo (2011) suggest that a suitable multiplication of scales would be with seven-point and five-point Likert scales. This recommendation supported the decision to score on a seven-point scale and apply weighting on a five-point scale. However, it was considered that approach should be checked before it was finalised in the Tool. Six earlier designs that had been evaluated by a more global method were re-assessed using this scoring and weighting system. The Project Team reviewed the two sets of results and agreed that the Tool provided a considerably more targeted and accurate result, but did not distort any of the specific performance or amenity attributes. It was therefore decided that the scoring and weighting system should be incorporated into the Tool.

4.4 Conclusion

The purpose of this chapter was to initially examine the literature that demonstrates aspects of high quality in house design, and sheltered housing in particular, over the period 1997–2011. It was concluded that although the literature on housing research is substantial, there was a need to identify a methodology to filter and focus the sources for the criteria for assessment, which would then be added to the Tool. The themes identified by analysis of the publications under each of the sub-headings generated a number of evaluation criteria, grouped by statements. The next stage was to explore and make use of appropriate scaling methods that would assist the accuracy of evaluations. It was discovered that a seven-point scoring scale produced the most consistent results, though the criteria of assessment would be weighted on a five-point scale. Once all the criteria are scored, each is multiplied by its weighting and the total weighted score for the category is calculated. In the following chapter, the testing of the Tool will be discussed.

Chapter 5: The Proposition

Chapter 5: The Proposition

5.1 Proposal for Final Tool and the User Guide

5.1.1 Introduction

This part of Chapter 5 discusses the proposal for the final Tool. The aim of the Tool's layout is to ensure that the assessment of designs is consistent and the assessors are able to use it without difficulty. This part also discusses the development of the guidance notes, contained within the User Guide, to provide more detail, contextual information and references to support the Tool. The full version of the Architectural Design Quality Evaluation Tool and the User Guide are provided on a CD with this thesis.

5.1.2 Headings, Sub-headings, Output Specification and Criteria

The Tool is based on the Design Quality Hierarchy Assessment Diagram (see Figure 2.19) and has been developed in three layers, i.e. *Headings, Sub-headings* with *Statements,* and *Criteria for Assessment*. Fundamentally, the Tool is built on the nine *Headings* that were identified from the output specification document and were confirmed with modifications after the exemplar study. Each of the nine category headings is further divided into *Sub-headings* and *Statements*. Every *Statement* is assessed through a *Criterion* or *Criteria*. As discussed in Chapter 4, each of the *Criteria for Assessment* is assigned a *Weighting*, which is part of the permanent template. Assessors evaluate the designs by scoring each of the *Criteria for Assessment*. The *Bidder Section Scores* are attained by multiplying the assessors' *Score* by the *Weighting*. A summary of the layout is shown in Figure 5.1.

Figure 5.1: The layout of the Tool

Structure of the Tool

The cover sheet of the Tool shows the nine main *Headings*, i.e. categories C1 to C9. These nine *Headings* summarise the scores for an assessed scheme. There is a percentage allocated to each of these nine *Headings* (see Table 5.1). It was decided through consensus amongst the Research and local authority Project Teams that the percentages should vary between the new build and refurbishment schemes to reflect the scope of each approach. It was also recognised that in subsequent projects, the stakeholders may wish to re-allocate the percentages in accordance with their own priorities. The cover sheet of the Tool provides the *Section Scores* and *Total Score* for each evaluated scheme (see Figure 5.2 for indicative percentages). It also provides confirmation of the name of the scheme, bidder, reviewer and date.

Table 5.1: Overall structure of the Tool

	Category	Percentage allocated		Mean weighting
		New Build	Refurbishment	
1.	Context	7.00%	7.00%	4.10
2.	Building Form	14.00%	13.00%	4.00
3.	External Spaces	14.00%	10.00%	2.80
4.	Entrances	10.00%	11.00%	2.63
5.	**Communal Spaces**	**17.00%**	**20.00%**	**4.44**
6.	Service Spaces	10.00%	12.00%	1.90
7.	Circulation Spaces	10.00%	10.00%	2.93
8.	Apartments	10.00%	12.00%	3.00
9.	Architectural Components	7.00%	7.00%	2.00

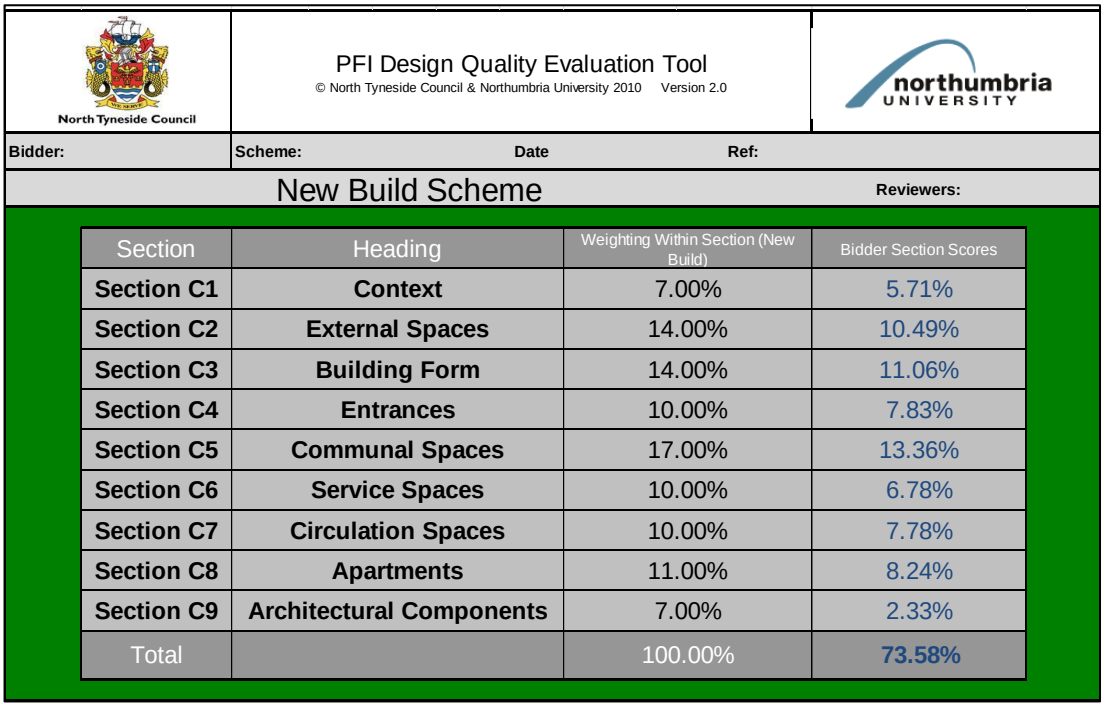
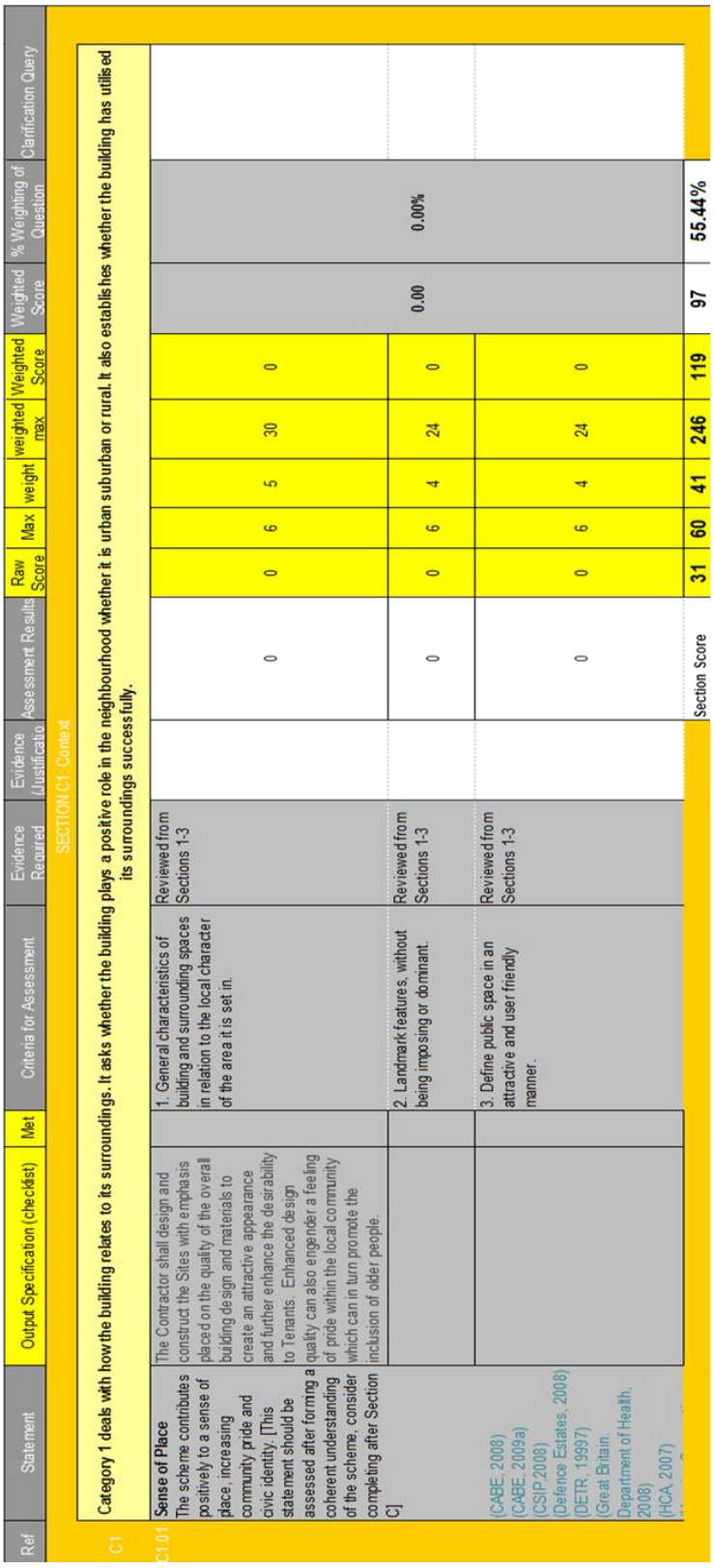


Figure 5.2: Cover sheet of the Tool, with indicative sample scores

Source: Author

The assessment of each of the nine *Headings* works in a similar way. Every category *Heading* has a separate assessment sheet. A context category assessment sheet is shown below to demonstrate the layout of a typical page (see Figure 5.3). While undertaking an evaluation for a scheme, assessors will complete sheets for all the nine *Headings.*



Ref	Statement	Output Specification (checklist)	Met	Criteria for Assessment	Evidence Required	Evidence (Justificatio	Assessment Results	Raw Score	Max	weight	weighted max	Weighted Score	Weighted Score	% Weighting of Question	Clarification Query
C1	SECTION C1: Context														
	Category 1 deals with how the building relates to its surroundings. It asks whether the building plays a positive role in the neighbourhood whether it is urban suburban or rural. It also establishes whether the building has utilised its surroundings successfully.														
C1.01	**Sense of Place** The scheme contributes positively to a sense of place, increasing community pride and civic identity. [This statement should be assessed after forming a coherent understanding of the scheme, consider completing after Section C]	The Contractor shall design and construct the Sites with emphasis placed on the quality of the overall building design and materials to create an attractive appearance and further enhance the desirability to Tenants. Enhanced design quality can also engender a feeling of pride within the local community which can in turn promote the inclusion of older people.		1. General characteristics of building and surrounding spaces in relation to the local character of the area it is set in.	Reviewed from Sections 1-3		0	0	6	5	30	0			
				2. Landmark features, without being imposing or dominant.	Reviewed from Sections 1-3		0	0	6	4	24	0	0.00	0.00%	
	(CABE, 2008) (CABE, 2009a) (CSIP 2008) (Defence Estates, 2008) (DETR, 1999?) (Great Britain. Department of Health, 2008) (HCA, 2007)			3. Define public space in an attractive and user friendly manner.	Reviewed from Sections 1-3		0	0	6	4	24	0			
							Section Score	31	60	41	246	119	97	55.44%	

Figure 5.3: Context category assessment sheet

As demonstrated in Figures 5.4 and 5.5, each assessment sheet is split into two sections: Template and Evaluation. The Template section includes *Sub-headings and Statements*, *Output Specification (checklist)*, *Criteria for Assessment* and *Weighting*. The Evaluation section contains the *Evidence (Justification)*, *Score* and *Weighted Score*.

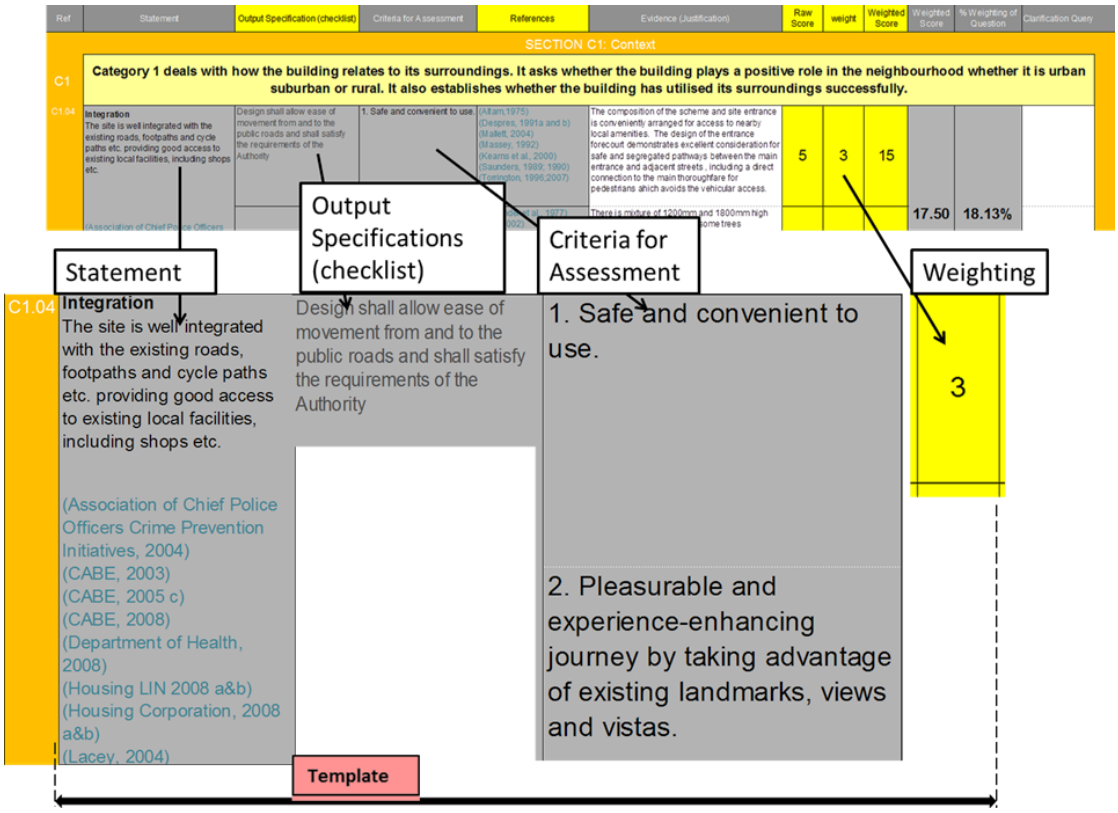


Figure 5.4: Template section of a typical assessment sheet
Source: Author

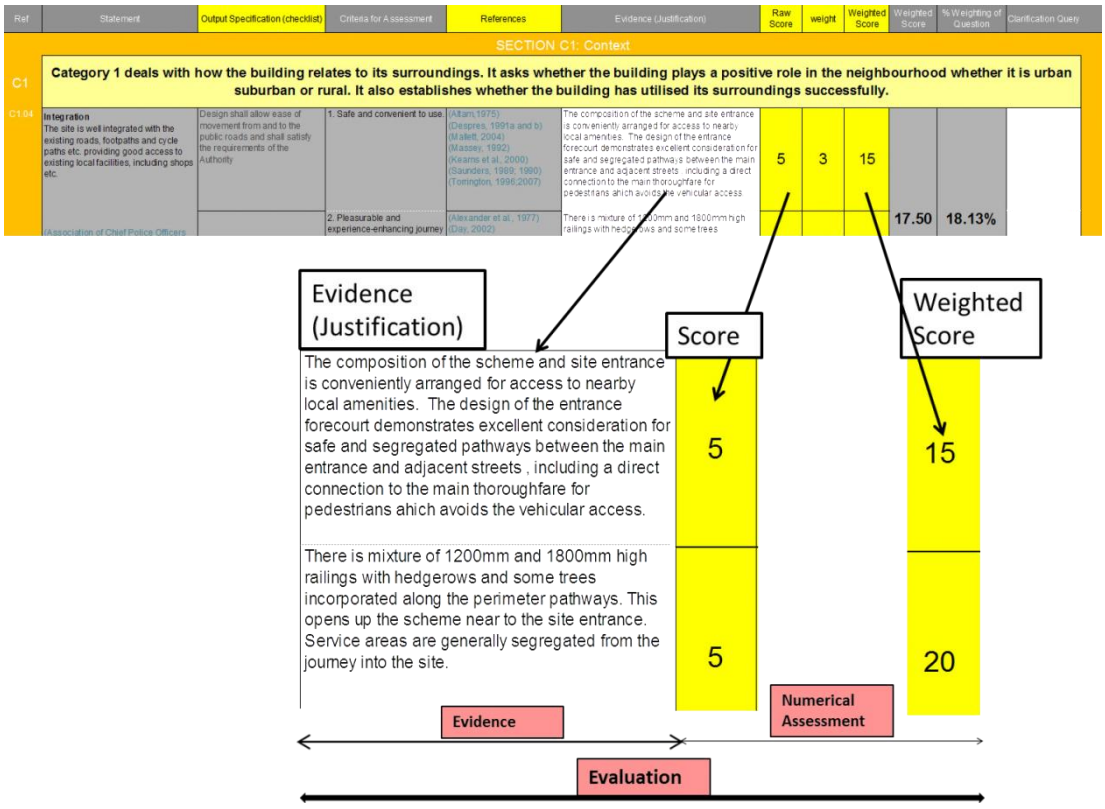


Figure 5.5: Evaluation section of a typical assessment sheet
Source: Author

Once all the *Criteria* have been scored, each is multiplied by its *Weighting* and the *Total Weighted Score* for the category calculated. This figure is divided by the *Total Weighted Maximum* for the category, and the quotient multiplied by the percentage allocation, as shown below. The resulting *Section Scores* from each category are then aggregated to find the *Total Score* for the scheme.

$$\frac{\textit{Total Weighted Score for each category}}{\textit{Total Weighted Maximum}} \times \textit{Weighting Within Section} = \text{category contribution to } \textit{Total Score}$$

As the Tool has been developed electronically, there is an opportunity to hide columns that are not required during certain phases of the process. For example, the references do not contribute to the evaluation and can therefore be hidden while assessments are taking place. However, they are

important to the credibility of the Tool, and can therefore be displayed in any discussion on how the Tool was developed (see Figures 5.4 and 5.5).

Results

Following an assessment, it is important to present the results in a way that is useful and understandable, both for the decision-makers and as feedback to the bidding consortia. Thus, the results sheet is designed in such a way that it can be used for the evaluation of the designs, and during competitive dialogue. It provides a graphical representation of the scores for each *Heading* to assist bidders and assessors in understanding where additional effort is required. An example is shown in Figure 5.6. This layout helps to provide a comprehensive breakdown of all the *Criteria* assessed, as well as showing how the components go together to provide the *Overall Score*. Each part of the results sheet is discussed in detail below.

Overall Score: This is a summary of the assessment for a scheme, where it can be seen at a glance which categories are scoring well or not (see Figure 5.6). This is useful during competitive dialogue, as it shows which categories have received insufficient attention and provides a clear indication as to where the bidder's design resources should be targeted. For instance, the example in Figure 5.6 indicates that the bidder has scored well for most of the issues but should still improve the *Service Spaces*, while *Architectural Components* needs considerable attention. This information allows the local authority Project Team to direct the dialogue towards these issues, rather than concentrating on the areas where the bidder has scored well. However, the radar chart does not provide the actual overall percentage score for the assessed scheme.

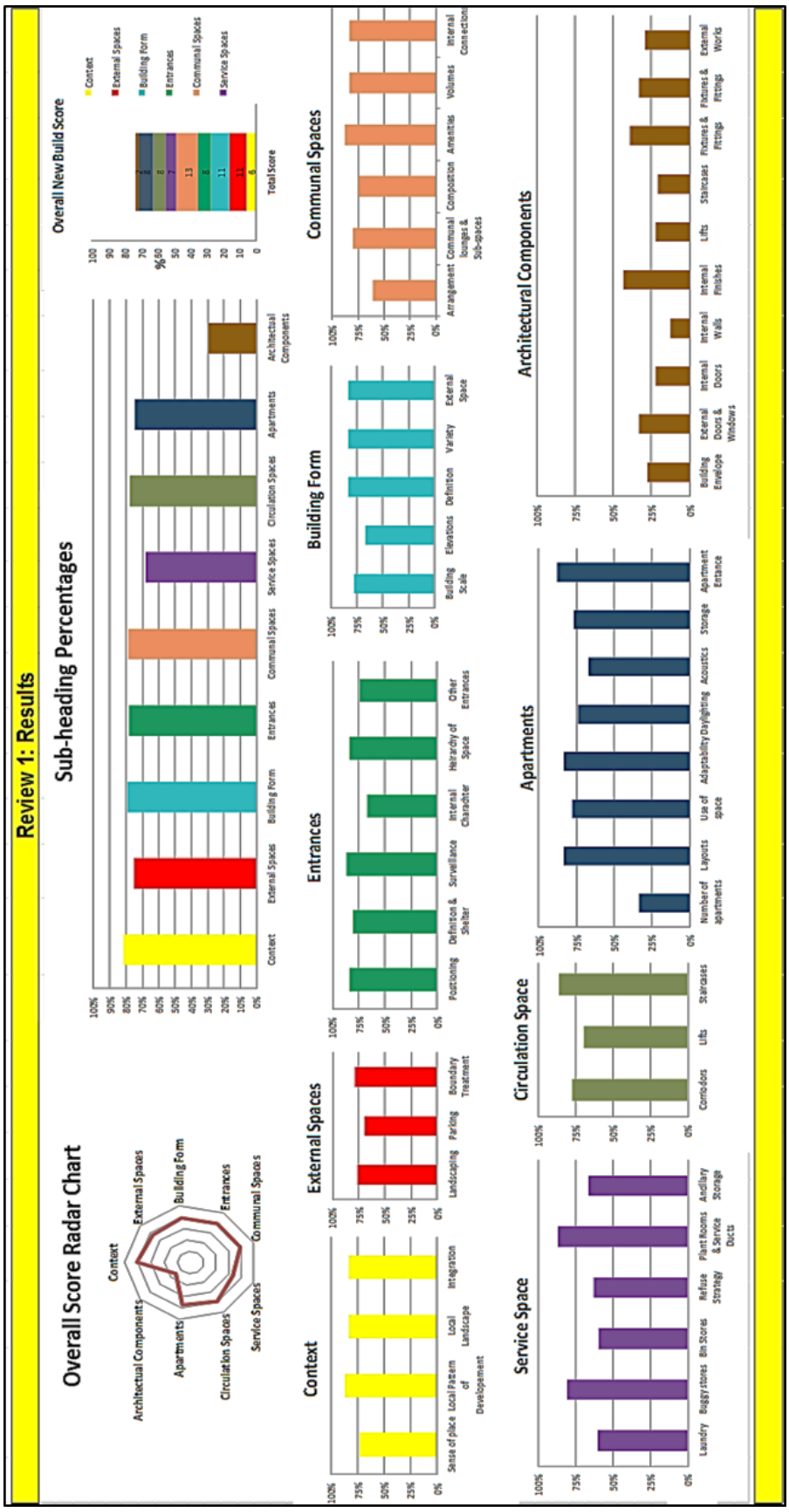


Figure 5.6: Sample results sheet

Overall Percentages: In addition to the radar chart, an illustration titled *Overall New Build Score* (see Figure 5.6) provides the percentage score for each category of the Tool, stacked to show the overall percentage result. This illustration can also give an indication of which categories the bidder has scored the most, and where more effort is required.

Sub-heading Percentages: Each of the categories is represented by a chart that shows the score for its *Sub-headings*, enabling the local authority Project Team and the bidders to identify areas of weakness at a more detailed level.

5.1.3 User Guide

The Tool has only the necessary information for undertaking the assessment of the design quality for the submitted design proposals. However, there was also a perceived need to develop a supporting document that guides the users and also provides them with other relevant information required for carrying out the actual assessment. The User Guide was developed alongside the Tool and it sets out the stages at which the Tool could be used. It explains each criterion related to the *Sub-headings* and *Statements* which minimises the need for interpretation. This document helps to maintain consistency, as it develops the *Criteria for Assessment,* and this is significant in maintaining the reliability of the evaluation.

The User Guide consists of four main parts: Overview; Tool Configuration; Guidance Notes; References and Appendix (see Figure 5.7).

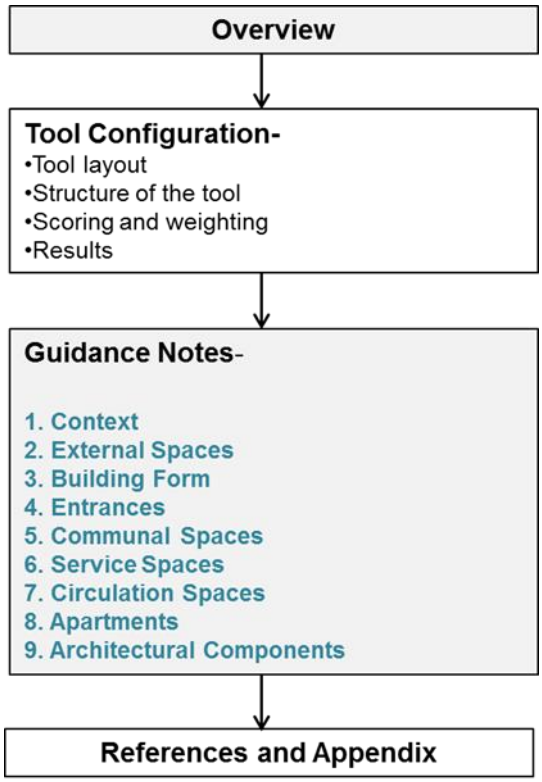


Figure 5.7: The structure of the User Guide
Source: Author

Overview

This provides an explanation of the Tool and its development. It sets out the stakeholders who would benefit from using the Tool and the stages at which it could be used. This section of the document also assists the assessors with all the information that is required before undertaking an evaluation. This is important, as the assessors need to receive clear and concise information, so that an accurate and equitable evaluation can be undertaken. Specific information is required from the design team at different stages of the assessment. This information could be in written and/or drawn form.

Tool Configuration

This part of the User Guide sets out the structure of the Tool, and calculation of the results. It shows that the layout is designed to offer maximum information in a usable and compact format. It also demonstrates the

function of each column in the Tool. In addition, it advises the assessors about using the Tool at different design evaluation stages, e.g. the conceptual design stage and detailed design stage. It shows how the Tool could be used for PFI competitive dialogue meetings or for standalone assessments. Further, the Tool Configuration section describes how the Tool could be used for documentation, information management and audit purposes. It can help to gather and manage information, and provides an audit trail for assessments and decision-making. It is also designed to assist in ensuring transparency and fairness during the PFI procurement process, and could be used for design workshops, where feedback can be obtained from the residents.

Finally, the Tool Configuration section discusses the *Weighting* and *Scoring* system, and the results mechanism in detail.

Guidance Notes

These notes offer more detail, contextual information and references to support each of the nine category *Headings*. They show how to assess the various categories so that a highly rated scheme demonstrates a strong concept in terms of the overall building form, structure and the materials used. The notes systematically discuss the nine *Headings*, 52 *Sub-headings* and *Statements* and 164 *Criteria* that together make up the Tool. The detailed information on each criterion helps to make the Tool user-friendly and minimises difficulty in the assessment of the designs.

References and Appendices

This last part of the User Guide lists the references used in the development of this document.

5.2 Testing of the Tool

This section discusses the testing of the developed Tool. It also presents an analysis of the evaluation of design proposals at Stage 3 of the process, i.e. the selection of the preferred bidder.

The first issue was who would be the most appropriate people to undertake the final evaluation and test the Tool. Although great care was taken with the vocabulary, the Tool still belongs to the world of architecture, and residents and other user groups may have found it somewhat alien. Also, they are not necessarily familiar with the range of issues on which it would be desirable for them to base their judgements. In any case, of more importance to commentators such as Markus (2003) are validity, reliability and consistency, and he agrees that respondents are often asked to judge something about which they have little knowledge. Therefore, a small group comprising the four members of the Project Team were selected to assess all the schemes against the criteria. The Scoring Group members had taken part in the design workshops, so they had first-hand experience of the User Group's views on the various issues. As suggested by Eley (2004), they needed to be conversant with the issues; the Scoring Group members had at least five years' architectural education in which the issues were debated, and were well versed in the terminology. All evaluations were carried out in strict accordance with the User Guide to ensure consistency. Two members of the Scoring Group together evaluated each scheme, and were then rotated for the next evaluation to avoid bias. The Scoring Group met with the Project Team and the Design Champion at weekly intervals, where they explained each evaluation. This constituted a Review Team. The clarification of each criterion in the User Guide also significantly reduced the need for interpretation. Instead, the evaluation relied for its consistency on the judgement of this informed group of assessors who were then required to justify their scores. As stated in the methodology, the researcher took the role of *observer as participant*. The Scoring Group reported that the Tool was user-friendly and did not cause any difficulties in the assessment of the designs. The Tool was used for all schemes, at three reviews with designs from two bidders.

5.2.1 Visualisation of the Results

The PFI procurement process of evaluation took place in three stages. The first stage was aimed at reducing the original six consortia to three bidders.

The second stage reduced the number from three to two, and the objective of the third stage was to select the preferred bidder (see Figure 5.8).

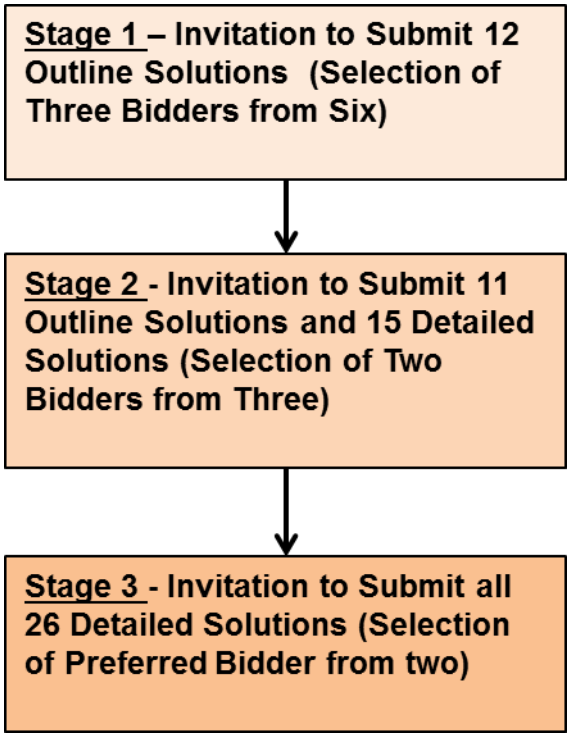


Figure 5.8: Stages of PFI procurement process
Source: Author

At the final evaluation stage, i.e. selection of the preferred bidder, detailed designs for all 26 schemes were produced. The final two bidders have been designated as S and T. The Research and Project Teams concluded that, even at this late stage, there should be opportunity for the bidders to improve their designs through an iterative process resulting from a series of reviews. However, it should not be forgotten that both the revision of designs and the review process are very resource-intensive in terms of time and money for all those involved in the consortia. A balance was struck at three reviews. As shown in Figure 5.9 below, each review was conducted in four steps.

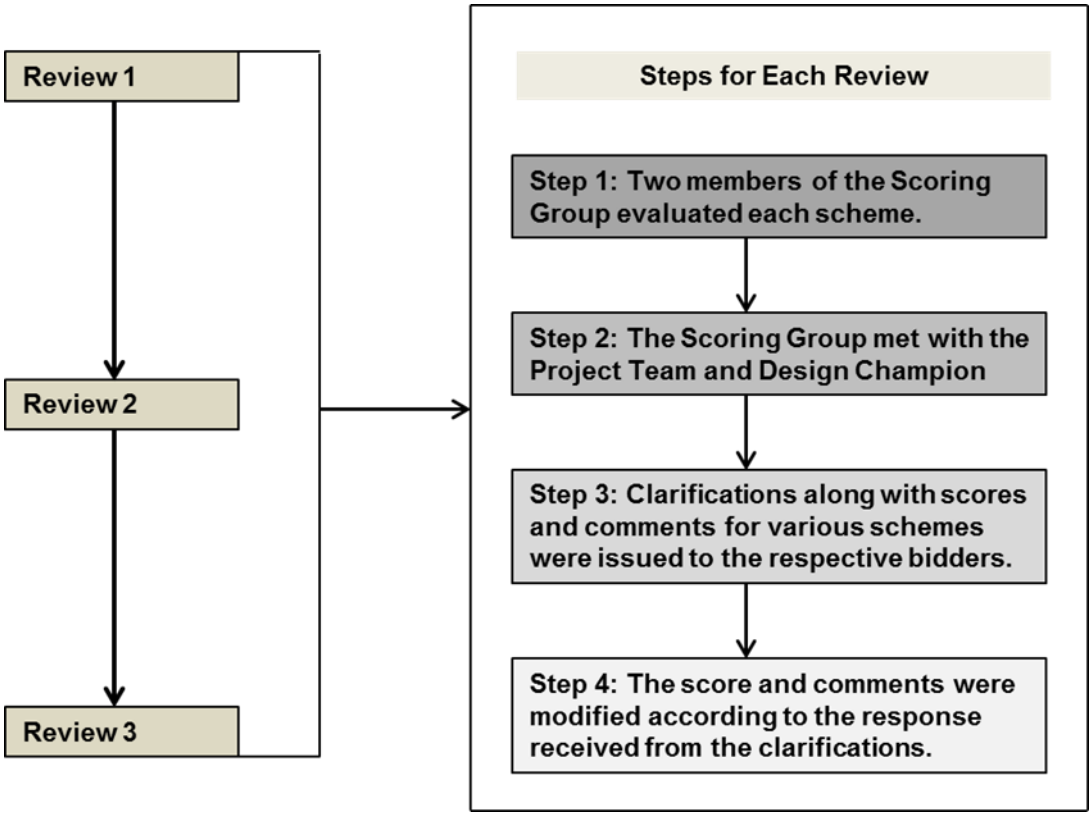


Figure 5.9: Steps of each review

Source: Author

Examples of Assessment

In order to show the value of the Tool as a means of improving designs, one of the categories – communal spaces – has been selected as an example. The reason for choosing this category is that it has the highest mean weighting of all the categories (see Table 5.1). Thus, each of the sub-headings and criteria will be demonstrated, with scores and justification from Reviews 1 and 2 (see Figures 5.10 to 5.21). Table 5.2 summarises the sub-headings and criteria for this category.

Table 5.2: Communal Spaces category with sub-headings and criteria

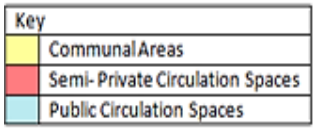
5.00 Communal Spaces			
Ref.	Sub-headings	Criteria	
5.01	Arrangement Communal Spaces are rationally and logically arranged within the building, and minimise unnecessary long journeys for the users	1	Grouping of the communal spaces as an overall strategy
		2	Travel distance between apartments and communal spaces are minimised in line with output specification
		3	There is access to external spaces while maintaining security

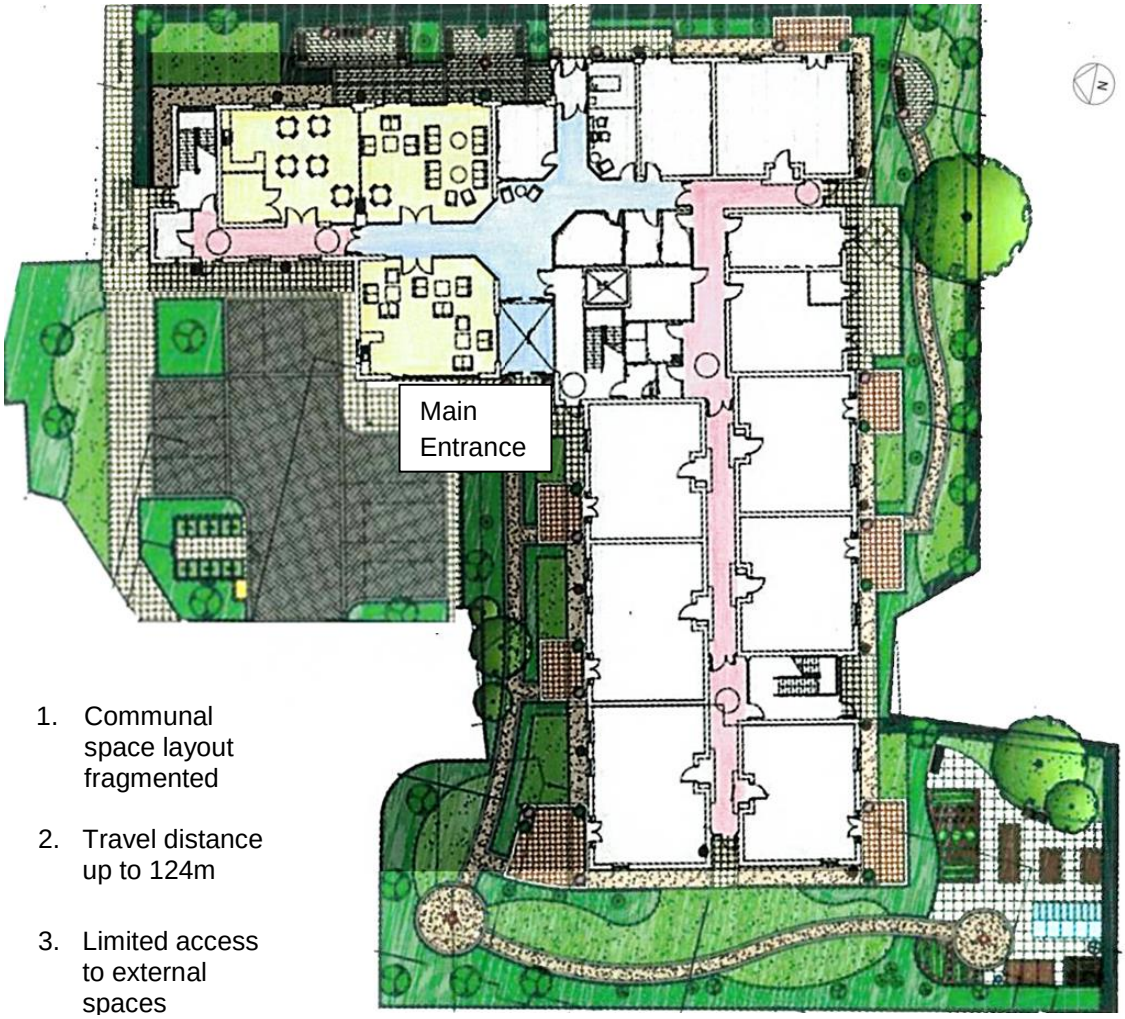
Table 5.2 (continued)

5.00 Communal Spaces (continued)			
Ref.	Sub-headings	Criteria	
5.02	Communal Lounges and Subspaces Lounges are flexible and rationally distributed throughout the building, and are appropriately dimensioned to the scale of the building. Also, all internal communal subspaces are rationally and logically arranged	1	Ratio of users to communal space. Total of lounge areas are a minimum of $2m^2$ per apartment and appropriately distributed throughout the scheme
		2	A variety of lounge spaces for different types of activity provided, e.g. quiet and active
		3	The communal lounges and subspaces are sufficiently adaptable for change of use and user capacity
		4	A sufficient number and size of communal subspaces are provided
		5	Communal space and subspaces are logically arranged
		6	There is sufficient and appropriately located storage arrangements
5.03	Composition Communal Spaces are composed to promote excitement, delight and comfort	1	Varied volumes are offered to create spatial variety
		2	Communal spaces maximise views, natural light and solar gain
		3	Communal spaces encourage local community integration, and use by family and friends
		4	Focal points such as fireplaces or attractive bay windows are incorporated into the design of the communal spaces
5.04	Amenities Successful strategy for integrating shops, services and public amenities, has been put in place	1	Grouping of activities within the building and the reflection of these activities to the external
		2	Encourage local community integration
		3	Realistic assessment of adaptable change of use specific to each space
5.05	Volumes The internal volumes of the Communal Spaces are coherent and consistent with the external form of the building	1	Major communal interior spaces are reflected in the reading of the external form
5.06	Internal Connections Where appropriate, the Communal Spaces provide views within the building	1	Views provided to enhance visual connection between other communal spaces

Arrangement

Communal Spaces are rationally and logically arranged within the building, and minimise unnecessary long journeys for the users. The proposals and the reviews are shown in Figures 5.10 and 5.11.





1. Communal space layout fragmented
2. Travel distance up to 124m
3. Limited access to external spaces

Criteria for Assessment		Evidence (Justification)	Score
1	Grouping of the communal spaces as an overall strategy	The communal space layout is fragmented as it is split between semi-public and private circulation, with north and south orientations	3
2	Travel distance between apartments and communal spaces are minimised in line with output specification	Maximum travel distances to communal space range between 70m on the ground floor to 124m from the furthest apartments on the first and second floors. Maximum travel distance from output specification should be 50m	0
3	There is access to external spaces while maintaining security	One communal space has no access to the outside, and overlooks the main entrance and parking area. Access to external space from other communal spaces overlooks the boundary and has limited security	2

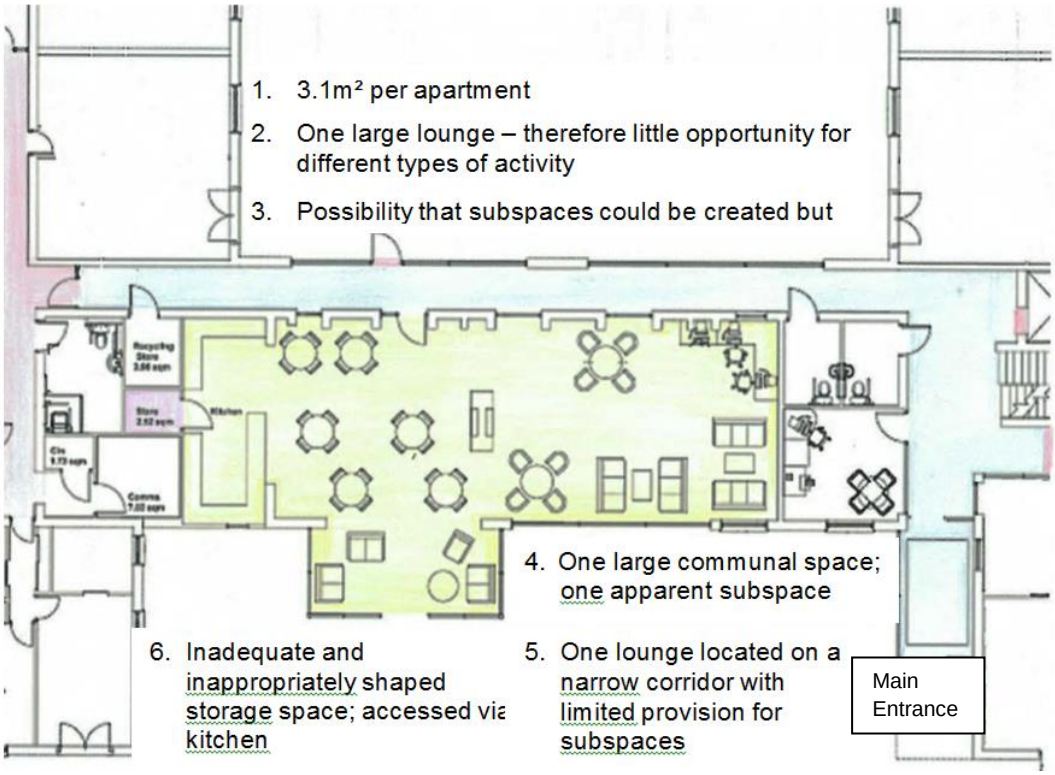
Figure 5.10: Arrangement – Review 1
Source: Author

Criteria for Assessment		Evidence (Justification)	Score
1	Grouping of the communal spaces as an overall strategy	Communal spaces are suitably grouped together around main entrance and circulation core. One of the communal spaces is designed in the private part of the scheme to offer a quiet space. Another is separated from the main space within the communal part of the scheme to provide an alternative orientation	5
2	Travel distances between apartments and communal spaces are minimised in line with output specification	Travel distance from furthest apartments to communal spaces is 37m. Maximum travel distance from output specification is 50m	6
3	There is access to external spaces while maintaining security	All communal spaces have good access to the garden while maintaining security, although the main space leads to a smaller part of the garden	4

Figure 5.11: Arrangement – Review 2

Communal Lounges and Subspaces

Lounges are flexible and rationally distributed throughout the building, and are appropriately dimensioned to the scale of the building. Also, all internal communal subspaces are rationally and logically arranged. The proposals and the reviews are shown in Figures 5.12 and 5.13.

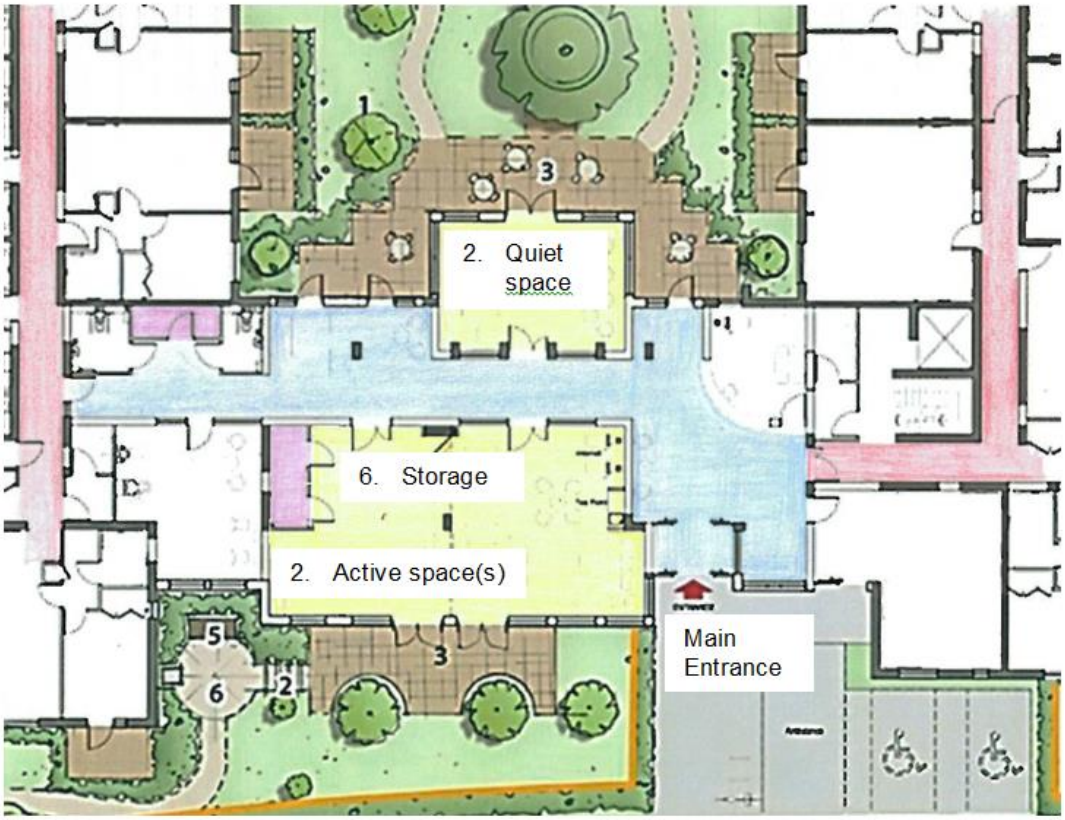


Criteria for Assessment		Evidence (Justification)	Score
1	Ratio of users to communal space. Total of lounge areas are a minimum of 2m^2 per apartment and appropriately distributed throughout the scheme	A total area of 114.95m² has been provided within the scheme. This offers 3.1m² per apartment. Minimum overall area of lounge space is 2m² per unit. Therefore, high level of provision but not distributed throughout the scheme	4
2	A variety of lounge spaces for different types of activity provided, e.g. quiet and active	One large lounge – therefore little opportunity for different types of activity	1
3	The communal lounges and subspaces are sufficiently adaptable for change of use and user capacity	Unclear where furniture would be located in change of use. There is a possibility that subspaces could be created but no provision for it	2
4	A sufficient number and size of communal subspaces are provided	One large lounge – one apparent subspace	1
5	Communal space and subspaces are logically arranged	One space located on a narrow corridor with limited provision for subspaces	2
6	There is sufficient and appropriately located storage arrangements	Inadequate and inappropriately shaped storage space; accessed via kitchen	1

Figure 5.12: Communal Lounges and Subspaces – Review 1

1. 3m² per apartment

3. Potential to host three different uses. The capacity of users can be varied between the spaces



4. Sufficient number and size of communal subspaces are provided

5. Spaces arranged around circulation adjacent to the main entrance

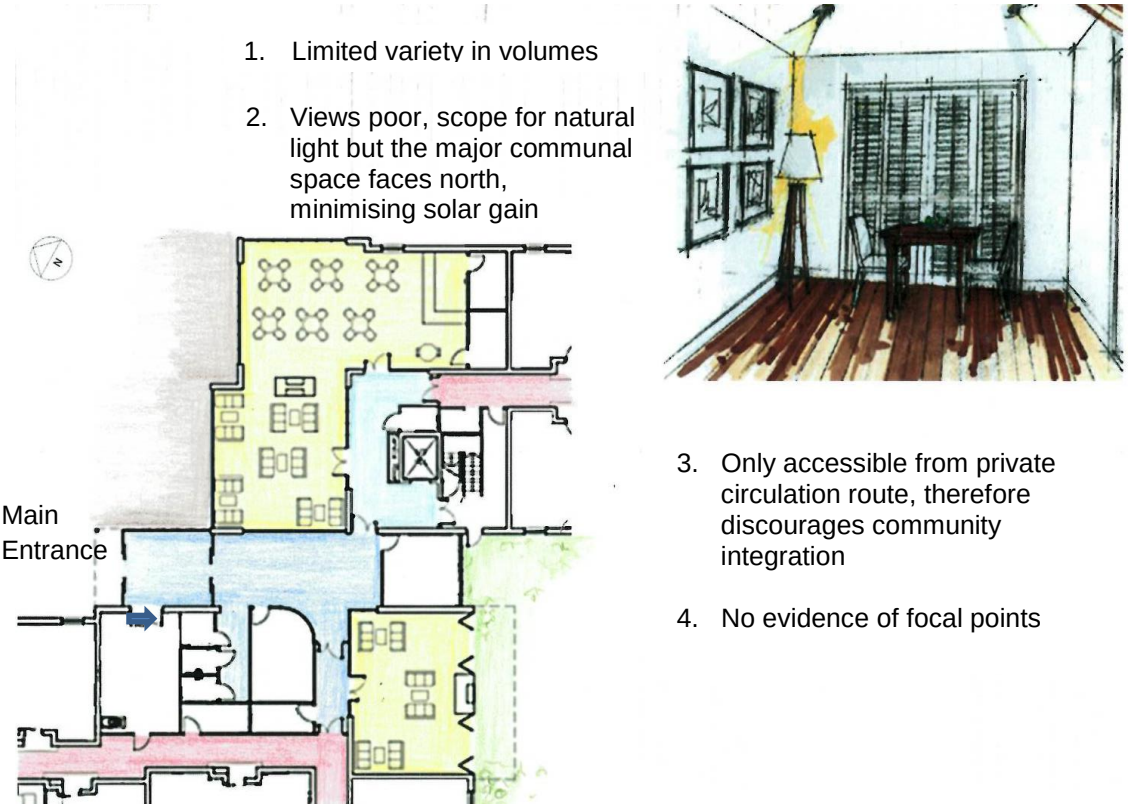
Criteria for Assessment		Evidence (Justification)	Score
1	Ratio of users to communal space. Total of lounge areas are a minimum of 2m^2 per apartment and appropriately distributed throughout the scheme	There are two lounges within the scheme, 76.8m² has been provided within the main lounge. The garden room adds a further 32.8 m². This provides 3m² per apartment overall. There is also good distribution of lounges in the scheme	5
2	A variety of lounge spaces for different types of activity provided, e.g. quiet and active	A main communal lounge and a garden room have been provided. The main lounge appears to be for more active uses with direct access to an outdoor terrace space. The garden room is ideally suited for quieter activities and has access to private outside space	5
3	The communal lounges and subspaces are sufficiently adaptable for change of use and user capacity	The lounges have the potential to host three different uses. The capacity of users can be varied between the spaces	4
4	A sufficient number and size of communal subspaces are provided	The subdivision of the spaces generates subspaces that are appropriate sizes for a variety of activities, and provide three options	3
5	Communal space and subspaces are logically arranged	The spaces are arranged around the semi-private circulation space adjacent to the main entrance	5

6	There is sufficient and appropriately located storage arrangements	The storage provision is conveniently proportioned for access and located within the communal space and additionally in the circulation space for flexible deployment	4

Figure 5.13: Communal Lounges and Subspaces – Review 2

Composition

Communal Spaces are composed to promote excitement, delight and comfort. The proposals and reviews are shown in Figures 5.14 and 5.15.



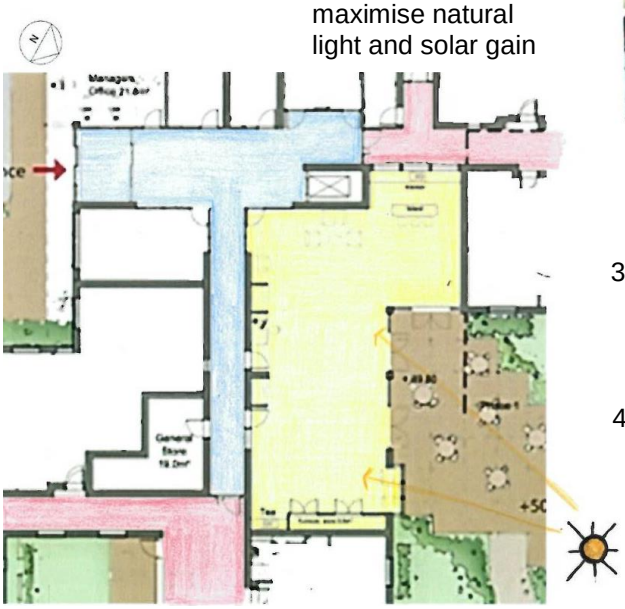
Criteria for Assessment		Evidence (Justification)	Score
1	Varied volumes are offered to create spatial variety	Volumes not varied and very limited spatial variety	1
2	Communal spaces maximise views, natural light and solar gain	The major space looks on to the car park; there are sufficient openings to admit natural light, but as the major space faces north, the amount of light is reduced and there would be little solar gain	1
3	Communal spaces encourage local community integration, and use by family and friends	All communal spaces are only accessible from a secondary (private) circulation route. It is therefore difficult to encourage the community, family and friends because there are security doors between the entrance and the communal spaces	1
4	Focal points such as fireplaces or attractive bays windows are incorporated into the design of the communal spaces	No evidence of focal point of this type	0

Figure 5.14: Composition – Review 1

Source: Author

1. Varied volumes create spatial variety

2. View to the garden, oriented south, to maximise natural light and solar gain



3. Communal spaces accessible from primary (semi-public) circulation route adjacent to main entrance

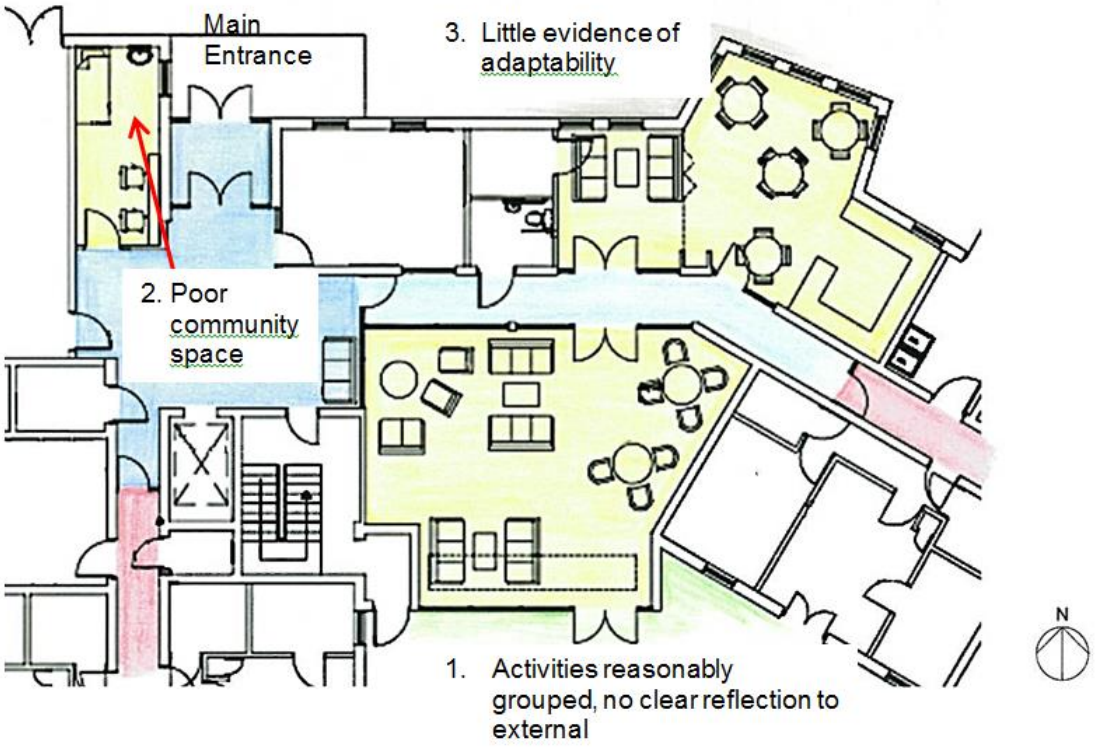
4. Fireplace acts as focal point

Criteria for Assessment		Evidence (Justification)	Score
1	Varied volumes are offered to create spatial variety	The volumes in the communal spaces are varied, create spatial variety and enable different	5
2	Communal spaces maximise views, natural light and solar gain	Attractive view into the garden, oriented south, to maximise natural light and solar gain	5
3	Communal spaces encourage local community integration, and use by family and friends	Integration with the local community, family and friends is achieved by the principal communal spaces being accessible from primary (semi-public) circulation route adjacent to main entrance	4
4	Focal points such as fireplaces or attractive bays windows are incorporated into the design of the communal spaces	Fireplace acts as focal point	4

Figure 5.15: Composition – Review 2
Source: Author

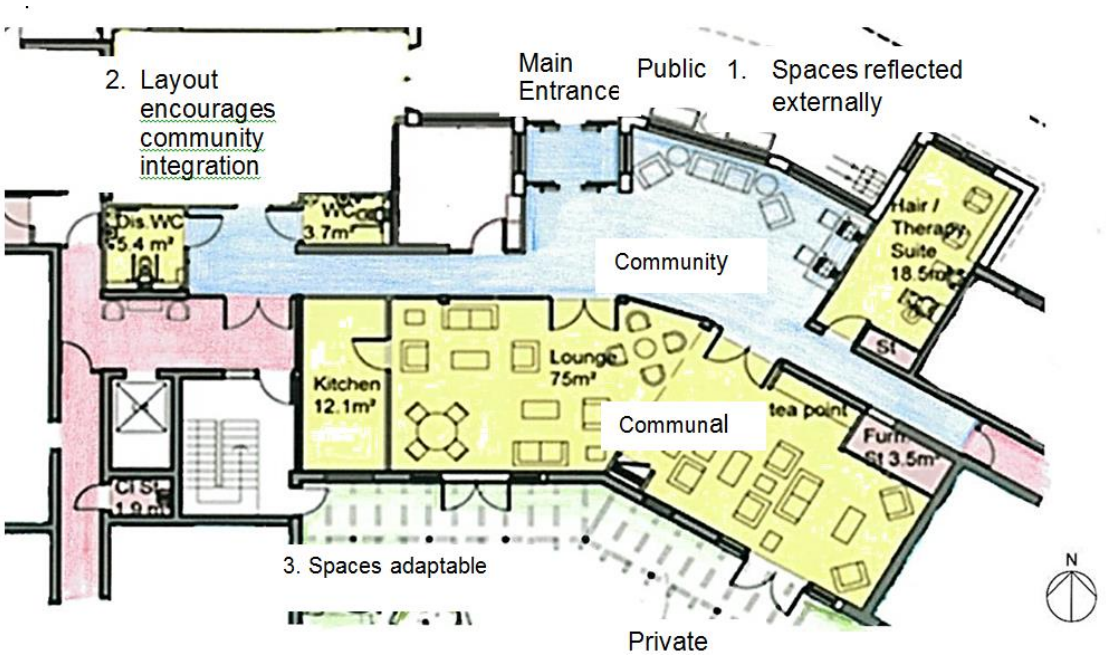
Amenities

Successful strategy for integrating shops, services and public amenities has been put in place. The proposals and reviews are shown in Figures 5.16 and 5.17.



Criteria for Assessment		Evidence (Justification)	Score
1	Grouping of activities within the building and the reflection of these activities to the external	Activities reasonably grouped but separated from community space by different circulation routes. No clear reflection to the external	3
2	Encourage local community integration	Poor community space separated from communal spaces	1
3	Realistic assessment of adaptable change of use specific to each space	No apparent capability for adaptable change of use, and especially not related specifically to each space	2

Figure 5.16: Amenities – Review 1



Criteria for Assessment		Evidence (Justification)	Score
1	Grouping of activities within the building and the reflection of these activities to the external	There is a clear hierarchy of spaces from public to private, and the activities are reflected externally	5
2	Encourage local community integration	There is a good meeting space next to the community room and adjacent to the communal spaces	5
3	Realistic assessment of adaptable change of use specific to each space	The communal space has scope for adaptable change of use	4

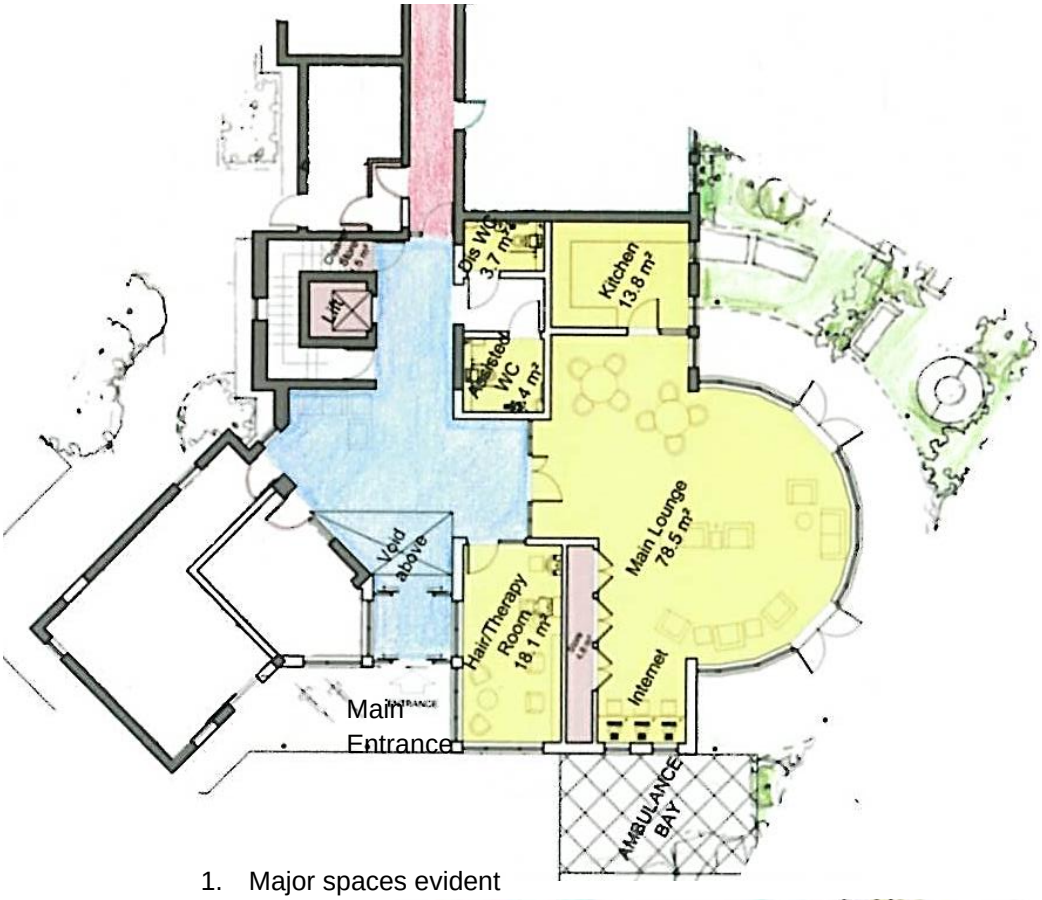
Figure 5.17: Amenities – Review 2

Volumes

The internal volumes of the communal spaces are coherent and consistent with the external form of the building. The proposals and reviews are shown in Figures 5.18 and 5.19

Criteria for Assessment		Evidence (Justification)	Score
1	Major communal interior spaces are reflected in the reading of the external form	The façade of the major communal space to the right of the Main Entrance on ground floor level is not treated any differently from the apartments above it	2

Figure 5.18: Volumes – Review 1



1. Major spaces evident externally

Criteria for Assessment		Evidence (Justification)	Score
1	Major communal interior spaces are reflected in the reading of the external form	The communal spaces are grouped around the main entrance, offering an interesting aesthetic that reflects those uses. On the first floor, to the left of the entrance, a different kind of architectural language is evident	5

Figure 5.19: Volumes – Review 2

Internal Connections

Where appropriate, the communal spaces provide views within the building. The proposals and reviews are shown in Figures 5.20 and 5.21.

1. Lack of views between spaces limits visual connection

Criteria for Assessment		Evidence (Justification)	Score
1	Views provided to enhance visual connection between other communal spaces	Subdivision of communal spaces limits visual connection between them	2

Figure 5.20: Internal Connections – Review 1

1. Views between spaces enhances visual connection

Criteria for Assessment		Evidence (Justification)	Score
1	Views provided to enhance visual connection between other communal spaces	The juxtaposition of the spaces enables different their complementary interior designs to be viewed from each other	5

Figure 5.21: Internal Connections – Review 2
Source: Author

The above examples demonstrate that the iterative *Scoring* and *Evidence* approach, which is fundamental to the Tool, enabled bidders to develop their proposals. By taking this approach the council ensured an audit trail and justification for decision-making. However, it also shows the significance of

feedback for the designers, helping them to deliver designs of the highest quality.

Thus, there were evaluations from 26 schemes × 3 reviews × 2 bidders = 156 results, which are available on the researcher's website, http://architecturedesignqualityevaluation.moonfruit.com/. It was concluded that the most effective way of presenting the results would be one graphical sheet per review, generating 156 sheets. As shown in section 5.1 above, each review sheet needed an overview but also sufficient detail to enable bidders to target specific areas for improvement after Reviews 1 and 2.

All the results from the final evaluation stage are summarised in Table 5.3.

Table 5.3: Summary of results

New Build (in %)										
Bisley		Bristol		Broadway		Chapelville		Clifton		Scheme
S	T	S	T	S	T	S	T	S	T	Bidder
59.1	42.8	59.5	57.1	52.8	60.6	63.4	56.2	77.6	65.3	Review 1
80.5	66.1	76.0	61.1	70.3	71.7	73.5	66.7	83.0	77.2	Review 2
80.7	70.3	78.4	66.3	72.2	73.8	74.0	68.5	83.7	80.6	Review 3
Crummock		Eldon		Marden		Phoenix		Roseberry		Scheme
S	T	S	T	S	T	S	T	S	T	Bidder
66.0	62.5	74.5	59.3	61.1	51.4	55.6	57.5	58.4	38.5	Review 1
76.3	70.9	76.9	67.3	71.1	61.4	73.8	66.0	77.4	70.4	Review 2
76.6	72.5	79.2	69.1	72.2	62.5	74.2	71.3	77.6	72.4	Review 3

Refurbished (in %)								
Carlton		Carville		Cheviot		Eccles		Scheme
S	T	S	T	S	T	S	T	Bidder
64.4	56.8	57.8	53.1	57.2	47.0	50.7	47.7	Review 1
75.9	62.2	74.2	69.4	74.8	61.3	76.8	60.5	Review 2
77.9	64.0	74.6	73.3	75.1	65.0	77.2	64.8	Review 3
36.7		33.5		36.1		20.6		Existing
41.2		41.1		39.0		56.6		Value Added
Emmerson		Feetham		Ferndene		Fernlea		Scheme
S	T	S	T	S	T	S	T	Bidder
50.7	50.6	62.5	51.9	50.1	47.6	61.0	57.3	Review 1
60.5	56.5	72.1	70.4	73.5	68.5	70.2	67.0	Review 2
61.9	59.5	73.7	72.3	78.0	75.3	70.8	67.7	Review 3
35.6		44.3		33.3		28.3		Existing
26.5		29.4		44.7		42.5		Value Added
Orchard		Preston		Rosebank		Rudyard		Scheme
S	T	S	T	S	T	S	T	Bidder
57.6	59.1	61.9	55.6	54.5	47.5	58.0	53.1	Review 1
67.3	61.7	73.0	66.9	70.5	60.1	72.6	56.5	Review 2
68.7	62.2	76.6	71.7	70.6	63.8	74.1	59.9	Review 3
28.2		41.9		30.4		45.6		Existing
40.5		34.7		40.2		28.5		Value Added
Skipsey		Southgate		Tamar		Victoria		Scheme
S	T	S	T	S	T	S	T	Bidder
58.2	48.5	58.6	66.1	64.6	42.9	61.7	65.3	Review 1
68.5	59.8	77.7	68.3	74.9	63.3	68.2	70.1	Review 2
69.4	61.2	78.2	68.7	77.1	64.5	69.4	70.6	Review 3
35.3		53.4		30.3		36.6		Existing
34.1		24.8		46.8		32.8		Value Added

5.2.2 Analysis and Discussion

As shown in Table 5.3, both bidders received relatively low scores at Review 1, although Bidder S scored higher than Bidder T for virtually all schemes. The scores for the refurbishment schemes were consistently lower than the new build by 2%–5%. This may suggest that the bidders paid slightly more attention to the new build or that they had greater scope, but the differences are not particularly significant. In Review 1, the spread of results was greater for new build than refurbishment. In Reviews 2 and 3, there was no consistent pattern and little to choose between the spread of results, indicating that there is no bias towards either new build or refurbishment in the use of the Tool.

The feedback from Review 1 seems to have been effective, as on average Bidder S improved their score by 20.9% for new build in Review 2, and Bidder T by 23.2%, while the standard deviations reduced by 3.98 and 3.68 respectively. The improvement in the refurbishment schemes was similar, as Bidder S improved their score by 23.8% and Bidder T by 20.3%. The standard deviations started from a narrower position, and therefore the reductions were less dramatic, at 0.32 and 1.85 respectively. The improvements from Review 2 to Review 3 were noticeably more modest. For new build, the change was only 1.3% for Bidder S and 4.1% for Bidder T, with equally small changes in standard deviation (0.16 and 0.06). In the refurbishment projects the change was only 1.9% for Bidder S and 4.1% again for Bidder T. The standard deviation for both bidders actually increased by 0.21 and 0.22 respectively.

The Review Team concluded that the introduction of two reviews had been worthwhile, as there had been significant improvements, but that Review 3 would probably be discontinued in future. The margins between the two bidders decreased with each successive review for new build (14.0%, 11.8%, 8.8%), but did not follow the same pattern for the refurbishment projects (9.4%, 12.5%, 10.2%). The objective of raising the design standard of all schemes was achieved, but Bidder S maintained a clear advantage throughout all the reviews. The notion of scoring the existing buildings

demonstrated added value but was adopted quite late in the process. The differences between the existing and proposed for both bidders are shown in Tables 5.3 and 5.4. The average increase in value was 106%. It was eventually realised by the Project and Research Teams that the potential of the Tool could be enhanced if all existing buildings were to be scored at an early stage, as part of the decision-making on prioritising cases for redevelopment or refurbishment.

Table 5.4: Analysis of results

Reviews	Bidder S		Bidder T	
	Mean	Standard deviation	Mean	Standard deviation
New Build : 10 schemes				
1	62.8%	7.92	55.1%	8.55
2	75.9%	3.94	67.9%	4.87
3	76.9%	3.78	70.7%	4.81
Refurbishment : 16 schemes				
Existing(Mean)	35.6%			
1	58.1%	4.65	53.1%	6.59
2	71.9%	4.33	63.9%	4.74
3	73.3%	4.54	66.5%	4.96

The Project and Research Teams were confident that the Tool had provided both a means for improving the design quality of all the schemes and demonstrated which bidder offered higher quality design. However, the Treasury Task Force (2007) had stated the need to ensure that design proposals are consistent with the budget available for the project. There have been anecdotal assertions, especially in PFI projects, that an increase in design quality would render the projects unaffordable. The use of the Tool and the presentation of results from the reviews enabled bidders to model specific design changes in relation to their effect on projected expenditure. Informal feedback from the bidders made it clear that they had tested different options for particular design changes against the model for the budget. The financial projections are shown alongside the budget in Figure 5.22. Contrary to unsubstantiated opinion (Evans and Hartwich, 2005), both bidders were within budget and followed a similar profile. Overall, Bidder S was more economical than Bidder T, through the tactic of accelerating the construction period by 12 months. Increasing the rate of construction

emphasises the need to monitor the build quality carefully, and highlights a critical period when expenditure reaches the total budget amount. If Bidder S were to be selected as the preferred bidder, the Project Team would need to be very vigilant about these two issues during the construction period.

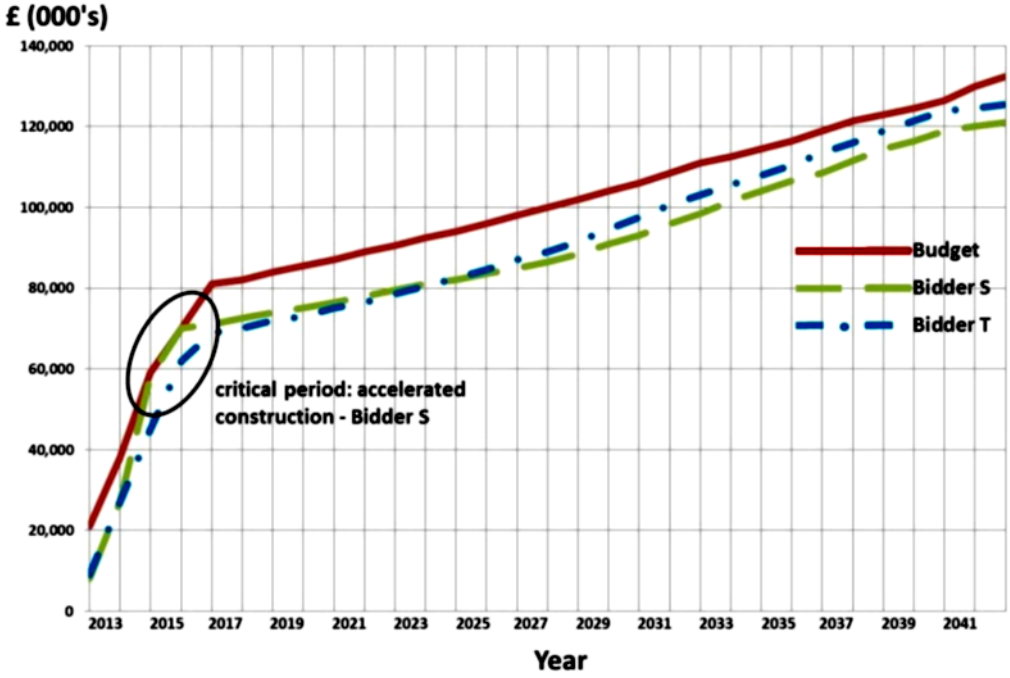


Figure 5.22: Financial projections for Bidders S and T set against budget

Feedback on the Operation of the Tool

It was acknowledged at the end of the process that feedback on the operation of the Tool should be requested from stakeholders, especially the council, for whom this Tool was developed, and the final two bidding consortia. This is significant, as it would help to gain their perspective of incorporating it into the PFI process. It would also assist in understanding their experience of using it. It was considered that an existing feedback schedule would offer the most objective means of obtaining responses from the bidders. Following consultations with the managers of the DQI programme, it was concluded that such a feedback mechanism did not exist. It was therefore decided to devise a question schedule from Graham (2005), and undertake a semi-structured telephone interview with each of the lead architects from the final two consortia (see Tables 5.5 and 5.6). Enquiries at the council revealed that it had already completed a feedback report, and

were willing to make it available for inclusion in this thesis (please see Table 5.7).

Table 5.5: Feedback from Bidder S

North Tyneside Council Private Finance Initiative (PFI) Project for 26 Schemes of Sheltered Housing Feedback from the Lead Architect of the final two Consortia

A Design Quality Evaluation Tool was developed during this project and its full version was used to assess schemes from the two remaining consortia in three reviews. This semi-structured telephone interview is to obtain your views on the operation of the Tool. The questions are being sent in advance, as discussed. The interview will not be recorded and only responses to the questions noted. The respondents will remain anonymous and will be identified only as the architect for Bidder S or Bidder T.

Bidder S

• As part of the selection of preferred bidder, did you find the Tool beneficial?
Yes, I would say the Tool was beneficial on the whole. It was a little difficult to understand initially but once we got that right it was very beneficial. The Tool actually made the things much clearer. In our previous experience, there was no such thing. So we kept guessing as to what the other party wanted. This Tool provided a methodological approach, basically the competitive dialogue and the Tool worked very well together. The feedback helped us to test our proposals and propose a better solution. On previous projects, we never got such comprehensive feedback, and looking at the scale of the project and the amount of work involved, I think this one would have been really difficult without the Tool and evaluation mechanism. I would say the Tool saved us time.

• Did you find that the Tool helped with the improvement in specific aspects of the designs during the whole process?
Yes it did, but as we could not see the scores it was difficult to comprehend. On the whole it did help with the improvement in specific aspects of design. An example that I remember is the design of the communal spaces that should be like public areas and the apartments should have a more domestic look and that should be clear from the outside. So basically it was a much clearer approach and helped in developing designs. On the whole I would say it was all very positive.

• How did you find the operation of the Tool at each stage?		
Stage 1	Stage 2	Stage 3
It was probably less helpful in the very early stages, but during the later stages, the Tool and the feedback from it worked very well. The feedback helped in developing the designs. However, I would like to add that if the Tool was more visual, providing more graphical information, it would have been even better. For example, when we were working on developing the designs from the feedback, I remember my team had to highlight the issues that needed improvement. If the Tool could automatically highlight the issues graphically online, that would be really beneficial. I appreciate the amount of IT investment involved with that suggestion. Anyway, the results sheet graphical presentation was helpful.		

Table 5.5 (continued)

• Do you think that the Tool helped the decision-making at each stage?		
Stage 1	Stage 2	Stage 3
Yes, the Tool did help in decision-making and it noticeably demonstrated why certain decisions were made. The feedback from the council team was consistent at the different stages. Looking at the scale of the project, I could imagine how difficult it would be if such a process, i.e. the Tool, was not in place. The Tool provided comprehensive feedback. For example, scoring the spatial arrangement of certain facilities like communal spaces was very effective.		

• What is your view on the quality of feedback from the Tool?
Yes, I do agree that the Tool's feedback provided an appropriate level of detail. But I would like to add that if the scoring of individual criteria could be shared with the bidders, that would have been beneficial, it could be graphical, i.e. suggesting some zones. I myself cannot understand why it was not displayed, why only the overall scores of the section were provided. But I would say that the conversation with the council team in the competitive dialogue clarified these issues. So basically the feedback and the competitive dialogue worked very well together. Basically issues identified in the feedback could be easily resolved in the competitive dialogue meeting. I would say that the meetings were successful in a way because a comprehensive feedback was provided beforehand especially for the designs.

• Do you think that the Tool added rigour to the process?
Yes, I do feel that the Tool added rigour to the entire procurement process and it provided a more objective and balanced approach as compared to experience of other PFI bidding processes without the Tool or any mechanism. I would say that if the Tool would have been the part of the output specification document or could have been introduced to us earlier in the process, it would have been more beneficial, as the Tool provided clearer information on the council requirements. Our team was first designing according to the information that was provided in the output specification document and was guessing things. However, when the Tool was introduced, the issues became much clearer and I think if the Tool would have been the part of the output specification document, we could have spent more time on design development and less time on guessing.

• Do you think that the Tool increased fairness in the outcomes?
The Tool streamlined the entire design evaluation process. Definitely this Tool made the outcome fairer as bidders were treated on same parameters in design assessment. The Tool clearly defined the issues that need to address the council aspirations. The bidders had clear information. So the Tool certainly fairly treated the bidders in the assessment process. In my opinion I would prefer a process that used this Tool, as in the past we have had no experience of such a mechanism in the assessment process. I am working currently on a project where the assessment team has asked us to fill in a questionnaire to assess us. Yet, I would say no project has provided such comprehensive and clear feedback information as the Tool has. This all definitely helps increasing fairness in the outcomes.

Table 5.5 (continued)

• Did the Tool help in justification of decisions?
The Tool did help in the justification of decisions; I would say we have never experienced similar justification in other bidding processes in which we have been involved. The Tool feedback and the competitive dialogue complemented each other and further helped in justification. I could not imagine how else things would have been done, looking at the scale of the project.

• Are there any other points you would like to make?
I would say the Tool could be visually/graphically improved. The scoring system for the initial stages could be colour-coded – like a kind of 'web-based tool'. The Tool should be part of output specification document. I mean should be introduced earlier in the process. On the whole, the feedback mechanism provided a very systematic approach to the entire assessment process. The feedback also was very beneficial in the development of the designs in accordance with the needs of the users and to meet the council's requirements.

• The questions and answers will appear in the PhD thesis and may appear in future academic conference and journal papers. Do you feel satisfied with the questions and the responses you have given?
I am satisfied with the questions and the responses I have given to Monika Sharma. I would wish to support her in any way, to help her to achieve a successful PhD outcome.

Telephone interview carried out by……Monika Sharma.…….Researcher

Date ……25.03.2014……

Table 5.6: Feedback from Bidder T

North Tyneside Council Private Finance Initiative (PFI) Project for 26 Schemes of Sheltered Housing Feedback from the Lead Architect of the final two Consortia

A Design Quality Evaluation Tool was developed during this project and its full version was used to assess schemes from the two remaining consortia in three reviews. This semi-structured telephone interview is to obtain your views on the operation of the Tool. The questions are being sent in advance, as discussed. The interview will not be recorded and only responses to the questions noted. The respondents will remain anonymous and will be identified only as the architect for Bidder S or Bidder T.

Bidder T

• As part of the selection of preferred bidder, did you find the Tool beneficial?
Yes, I feel that the Tool was beneficial and made the entire selection process clearer. The Tool has excellent potential, however if the Tool's scoring and weighting was displayed I personally feel it would have been more beneficial for us. We have never experienced any such tool or procedure on any other project. Definitely, the feedback process did save time in the development of scheme designs.

• Did you find that the Tool helped with the improvement in specific aspects of the designs during the whole process?
Yes, the Tool's feedback helped to focus on particular aspects of the design, however I would like to add that if the Tool had been introduced earlier on in the process and the bidders could have been provided with some reference points - it would have been more beneficial. The Tool's feedback certainly helped in improving the designs, especially the meetings with the council team on the Tool's feedback was very helpful.

• How did you find the operation of the Tool at each stage?		
Stage 1	Stage 2	Stage 3
To be honest I cannot comment on the operation of the Tool in the first two stages, as I was not personally involved with it. However, our team reported that the feedback that we were receiving on the Tool and the meetings with the council team was really helpful. The feedback provided was certainly progressively more detailed throughout the stages and was really beneficial. The Tool definitely has great potential.		

• Do you think that the Tool helped the decision-making at each stage?		
Stage 1	Stage 2	Stage 3
Yes, I certainly feel that the Tool helped in the decision-making at each stage. The feedback was consistent and it clearly demonstrated why certain decisions were made. The discussion with the council team on the feedback was consistent with the decisions at each stage.		

Table 5.6 (continued)

• What is your view on the quality of feedback from the Tool?
The quality of the feedback that was provided during the assessment was excellent. Yes, I would say it was specific and provided at an appropriate level of detail. However, again I would like to add that if the scoring and weighting was also shared it would have been more beneficial.

• Do you think that the Tool added rigour to the process?
Definitely the feedback from the Tool added rigour to the assessment process. It did provide a more objective and balanced approach to the process, especially when comparing it with other projects where no such Tool was used. Yes, the feedback on the Tool was very clear and precise. Certainly the Tool's feedback had clear reasoning behind it.

• Do you think that the Tool increased fairness in the outcomes?
Yes, I think that the Tool increased fairness in the outcomes, although we would have liked to win. Definitely we would prefer a process that used this Tool. However, we would like to use the Tool fully. I mean where actually we could play with the Tool. The Tool definitely has great potential.

• Did the Tool help in justification of decisions?
Yes, the Tool's feedback did provide a clear justification of decisions. There was nothing like this justification of decisions in other bidding processes in which we have been involved. Yes, if we have the opportunity to use the Tool fully it would definitely help in future work.

• Are there any other points you would like to make?
Implementation of the Tool in the early stages as part of the output specification document. Opportunity to play with the Tool, getting used to the way it works as it has excellent potential.

The questions and answers will appear in the PhD thesis and may appear in future academic conference and journal papers.

Do you feel satisfied with the questions and the responses you have given? Yes, I feel satisfied with the questions and the responses that I have given. I wish you all the very best for the future.

Telephone interview carried out by …….Monika Sharma……..Researcher

Date ……04.04.2014……

It is clear from the responses that the lead architects from the final two consortia recognised the qualities and operational advantages of the Tool. It was also apparent from their responses that the use of the Tool should become standard practice on projects of this nature. They made very few adverse comments, but four issues that they raised should be addressed. It is important to remember that the Tool was developed during the design process for this project. It was therefore not available for use from the beginning. Nevertheless, the issues raised were:

- An IT version should be introduced as a kind of web-based tool, so that graphical issues could be highlighted online
- An opportunity to play with the Tool, to get used to the way it works, would have been good
- Scoring and weighting of individual criteria would have been beneficial, in addition to the overall scores
- The Tool should have been part of the output specification document or introduced at an earlier stage

The architects realised that a web-based tool would be a significant financial investment. It would be quite complicated to operate, and there would be security issues, as throughout the process no confidential information such as designs may be risked being leaked to competitors. There is also a view that the local authority should not be leading the designers by pinpointing specific issues to be revised. It comes close to doing the revisions for them. The Tool is now in the public domain and available for anyone to consult: thus, the weighting for each criterion is available. The point about making individual scores available is more debatable. It should be recalled that this is the first time the council has even discussed proposals with their authors, and viewed offering any scoring and feedback as a risk. This was debated with the council's Legal Department quite extensively. The council's view was that the more information that was made available to bidders, the greater the likelihood of them challenging decisions. Although this did not happen, individual scores appeared as a risk too far. Moreover, there are practical difficulties in assimilating so many detailed results. In addition, there

is a belief that a multitude of small design issues may not make a coherent overall design. The balance between analysis and coherence is quite delicate. The Tool can now be introduced at an early stage of a project. However, even though the output specification is included in the Tool, the latter cannot be part of the output specification, due to its status as a contract document.

The local authority Project Team was confident that the Tool had provided both a means for improving the design quality of all the schemes and demonstrated which bidder offered higher quality design. However, the council, as a statutory body, had invested in the process and perceived some risks. The mayor therefore required that an evaluative report be produced (see Table 5.7).

Table 5.7: Feedback from the local authority PFI Team

North Tyneside Council

North Tyneside Council Report on the Development and Use of the Architectural Design Quality Evaluation Tool for Local Authority Private Finance Initiative Sheltered Housing Projects

Introduction

The Evaluation Tool was designed to work within the Council's core business to provide the Community Services Directorate with the knowledge and ability to successfully influence and evaluate architectural design quality in a multi-million-pound PFI project. Prior to the development of the Tool, the Council had limited expertise/knowledge in this field. As a result, the Council has successfully evaluated high-quality architectural designs for 26 new build/refurbishment sheltered housing schemes.

How has the Evaluation Tool contributed to the Council's strategy?

The main objective was to ensure that this Private Finance Initiative (PFI) project provided Quality Homes for Older People. The Council's existing sheltered housing stock was only built in the 1970's and had become dated and is failing to meet the expectations and requirements of present day residents. As a result of this Tool, the Council now has a clearly structured methodology for improving design quality through a competitive dialogue procurement process.

Describe how the external factors arising during the period of the Tool development have impacted on the Council's strategy.

As a result of local and national financial reviews, the PFI project has been a protracted process resulting in the Tool development itself being extended by six months. Although these delays provided the Council with difficult challenges, they also provided the opportunity to develop the Tool to a very detailed level, which had not been envisaged in the original project plan. The development of the Tool has enabled a very clearly structured approach to the competitive dialogue process for the Council and the bidders. This approach has received recognition from all the bidders involved throughout the procurement process.

Table 5.7 (continued)

What specific business opportunity or need of the Company has the research addressed?

The Tool has provided the Council with the knowledge and ability to successfully deliver design quality of the highest possible standard throughout an extremely complex PFI procurement process. Furthermore, as a direct result of this KTP, the Council has been able to consistently evaluate and improve bidders' design proposals for 26 sheltered housing projects. Previously, the Council did not have this expertise, and without this research, external consultants would have needed to be engaged, at substantial cost to the Council. In addition, the success in developing the Tool has been instrumental in providing a rigorous framework, whilst also delivering high-quality architectural designs may lead to regional/ national recognition from the design professions and the construction industry.

What new knowledge and capabilities have the Council and its staff acquired as a result of this work?

The Council now has a structured approach for evaluating quality from inception to the detailed stages of the design process. The Tool has enabled previous practice to be reviewed, whilst also carrying out an extremely detailed analysis of all current requirements and best practice for older persons' accommodation. This has resulted in the Council acquiring greater knowledge and the core skills to deliver state of the art older persons accommodation that is fit for the 21st century and beyond.

Describe how the new knowledge and capabilities have been embedded into the business, e.g. preparation of process instructions, staff training.

In addition to the Design Quality Evaluation Tool a very detailed User Guide has been developed to explain the purpose and use of the Tool. As a result, the Council has been able to embed the knowledge learnt. To date approximately 30 staff from a number of internal departments (e.g. Planning/Building Control/Strategic Development) have been trained. The success of embedding this knowledge is that all the facets of architectural design are brought together, so that Planning and Building Control, for example, can view the proposals holistically, rather than an assembly of fragments. In future, the embedding process will continue, as new staff become engaged with the process, and the procurement systems develop.

Table 5.7 (continued)

Has the work improved the Council's operation in other ways, e.g. by changing management practices?

This work has been instrumental in embedding a structured approach on large construction projects related to architectural design quality and how it can be influenced during a competitive dialogue process. The Council is now in a very strong technical position to tackle future projects that may have key design quality goals. The simplicity of the Tool has ensured that the knowledge ascertained can easily be passed onto future Council employees that may get involved in project work. In addition to ensuring that the Council has a well skilled work force to deliver on sustainability issues, it is important to note that the Tool has been developed in a sensible and pragmatic way as to ensure that the focus for any construction project is on the building fabric. This fabric first approach ensures that the building is the main consideration for designers and not that of expensive bolt-on technology. By taking this approach the Council will ensure that it will be in a stronger position to meet statutory targets whilst also maximising the potential of future accommodation.

Please assess the nature and significance of the impact on your activities.

Please describe and, if possible, quantify each impact.

Impact	**None**	**Low**	**Med**	**High**	**Describe the nature of the impact**
Increased breadth of information or extent of dissemination				X	The Council now have a clearly structured Design Quality Evaluation Tool which can easily be used for future projects across multidisciplinary teams
Increased number of individuals benefiting				X	The dissemination of knowledge has not just been confined to the PFI core team – other departments such as Planning and Building Control have also benefited
Increased benefit per individuals affected				X	By having an overall view of all the facets of design quality in sheltered housing, individuals that previously specialised in specific fields now have a more holistic understanding and knowledge
Improved customer/ stakeholder satisfaction				X	This research has successfully involved residents and their views and has integrated these views with detailed proposals for older persons' accommodation

Table 5.7 (continued)

Impact	None	Low	Med	High	Describe the nature of the impact
Improved efficiency				X	The development of the Design Quality Evaluation Tool provided clear structure to an extremely complex PFI competitive dialogue process, ensuring time spent evaluating designs was extremely efficient
Other					

Please outline staff training.

Staff in other departments such as Planning and Building Control were closely involved within the project and all were trained on the design quality evaluation process as the Council had to ensure that no conflicting messages were sent to bidders. In doing this, staff in these fields have benefited as they now have a more holistic view of design quality.

Number of staff trained: 30

Has your experience of the Design Quality Evaluation Tool matched up to your expectations?

The fully developed Design Quality Evaluation Tool greatly exceeded the Council's expectations and the impact it has had on the PFI competitive dialogue process has been very successful in delivering architectural designs of the highest possible quality.

What other steps have been taken or are planned to disseminate the results of the research?

The Tool has been presented to RIBA Enterprises, and the Homes and Communities Agency, with a view to it becoming an approved document that can be marketed nationally. It has contributed to housing and planning strategies at North Tyneside Council. The participants have been consulted by the authors of the Government sponsored Housing our Aging Population (HAPPI) Report. There have been seminars with South Tyneside Council, Northumberland Unitary Council and Hull City Council, who were all involved with large scale PFI projects for sheltered housing. Methodologies and data also informed a KTP with Gateshead Council, and the Project Team was invited to present at the PPP/PFI in Social Housing Conference.

Table 5.7 (continued)

Are you willing for the results to be published as a Case Study (subject to protecting commercial interests)?

Yes.

Provide any additional comments to support your answer, if you wish.

- The Tool has the potential to become nationally recognised through the RIBA and HCA, with options to increase the scope to general housing and school design.
- At the PPP/PFI conference, private sector developers observed that it is the fairest way to evaluate architectural design quality, particularly remarking on the flexibility of the Tool.
- At all three stages of North Tyneside Council's assessment of proposals, bidders stated that it really helped them to meet the Council's requirements.
- No other assessment tool is currently available that offers the bidders, confidence that they are improving their designs during the process; and offers the authority confidence that it will not be subject to a legal challenge over its decision-making processes.

Do the Council and the University have any plans for further cooperation?

Yes

If 'Yes', please describe below. Please include continued joint working as well as continued participation.

The proposals for marketing the Tool have already been outlined in other sections of this report. The selection process for the preferred bidder still has two candidates. The team will be working together on the architectural design quality evaluation and enhancement, to inform the final selection, which will also be a test of the Tool. There are possibilities for extending the evaluation tool principle into other sectors, of which school design will be the first target. After the sheltered housing schemes are completed, there will be post-occupancy evaluation, and the quality of the finished products will be assessed in relation to outcomes from the design evaluation. The Tool was exclusively developed by Monika Sharma, who worked with the Project Team. The Council wishes to support her in any way to help her to achieve a successful PhD outcome.

PFI Project Team
North Tyneside Homes
Quadrant West - 2nd Floor
Silverlink North
Cobalt Business Park
NE27 0BY
17th January 2013

This is an overwhelmingly positive report with no adverse comments. Nevertheless, some of the arguably unexpected outcomes are worthy of highlighting.

- The council has been able to embed the knowledge learnt. To date approximately 30 staff from a number of internal departments (e.g. Planning/Building Control/Strategic Development) have been trained, so that, for example, Planning and Building Control can view the proposals holistically, rather than as an assembly of fragments. In future, the embedding process will continue.
- The Tool has been presented to RIBA Enterprises and the Homes and Communities Agency with a view to it becoming an approved document that can be marketed nationally. It has contributed to housing and planning strategies at North Tyneside Council. The participants have been consulted by the authors of the government-sponsored Housing our Aging Population (HAPPI) report. There have been seminars with South Tyneside Council, Northumberland County Council and Hull City Council, who were all involved with large-scale PFI projects for sheltered housing. Methodologies and data also informed a KTP with Gateshead Council, and the Project Team was invited to present at the PPP/PFI in Social Housing Conference.
- The Tool has the potential to increase scope to general housing and school design.
- No other assessment tool is currently available that offers the bidders confidence that they are improving their designs during the process, and offers the authority confidence that it will not be subject to a legal challenge over its decision-making processes.
- After the sheltered housing schemes are completed, there will be post-occupancy evaluation, and the quality of the finished products will be assessed in relation to outcomes from the design evaluation.

The feedback from the architects and the council contribute to the validation of the Tool and the User Guide.

5.3 Contribution to Knowledge

The principal contribution to knowledge is the provision of a mechanism for improving the much criticised design quality of buildings procured through PFI. In this instance, it was the development of a Tool for evaluating the designs of sheltered housing schemes. Enabled by the introduction of the competitive dialogue process, the operation of this Tool was the first time that bidders received an objective evaluation of their designs, which was enacted through the same criteria for each bidder, ensuring equality of treatment. Moreover, the Tool has the flexibility to be employed in at least two different ways. It can be a substantial part of a selection process, which ultimately identifies the preferred bidder. It can also be used for improving the quality of all submitted designs at any stage of the process. While existing tools provide useful benchmarks, and some offer means of structuring an evaluation, none are totally applicable in the context of PFI competitive bidding processes.

The Theoretical Framework from an early part of this study established that the concept of Home involves more than just meeting physiological needs. Older people, in particular, need increasing re-assurance in terms of their psychological needs. These are much less tangible, which is why existing quality assessment tools tend to avoid them. Based on the Quality Assessment Hierarchy, the Tool generated from this research integrates performance and amenity for the first time, bringing together provision for both physiological and psychological requirements. There is a notion that performance relates to buildings and amenity to the people who use them. This Tool emphasises the amenity attributes without neglecting performance, generating a totally new approach based on a design quality hierarchy. Thus, a different kind of relationship has been developed in this work – one that places the users' needs and desires at the centre of the study and its contribution to knowledge.

From the beginning, the importance of the amenity attributes was emphasised. Established through the analysis of how place and house can provide for the human needs – shelter, comfort, safety, security,

belongingness, status, self-esteem, privacy and beauty. This provision is essential for both quality of life and for successful ageing.

In terms of validation, the Tool has been examined by the Homes and Communities Agency (HCA), the UK government's national housing and regeneration agency for England, whose aim is to deliver high-quality housing that people can afford; and it is now included on the website at the following address, as an instrument setting new standards in design: http://www.homesandcommunities.co.uk/architecture-design-quality-evaluation-tool. A paper on it has been published in the leading academic journal *Building Research and Information*. The work has been discussed with the International Council for Research and Innovation in Building and Construction (CIB) Working Commission W096 Architectural Management. An initial paper was presented at the World Congress, Salford in 2010, and the results were presented at the World Congress, Brisbane in 2013. Subsequently, CIB requested an Impact Statement about the Tool, which is quite a rare accolade. The process underpinning its development and operation was awarded the position of finalist in the national Public Engagement Awards (2014). The lead architects from the final two bidders are enthusiastic about the Tool (see Tables 5.5 and 5.6), and the local authority produced an extremely positive report (see Table 5.7). Following a presentation at the PPP/PFI in Social Housing Conference (London, September 2010), interest has been expressed by other English local authorities with early-stage, large-scale redevelopment proposals, and exploratory seminars have been undertaken. A condensed and more generic edition of the Tool has been utilised by MArch students at Northumbria University, to enable them to evaluate the development of their own studio design projects.

5.4 Conclusion

The aim of this research was to establish a process that will deliver design quality in local authority Private Finance Initiative (PFI) sheltered housing projects. The following objectives were originally designed to address the perceived limitations of the PFI procurement process as well as

methodological issues. The aim of this study still holds true. However, the specific objectives have been refined as the research evolved to focus on the development of a structure and tool that could be used to assist the aim of maximising design quality. It is these objectives that are represented below.

The objectives of the research were to:

1. Critically evaluate the PFI process adopted by North Tyneside MBC, including the competitive dialogue and user consultation for its 26 proposed sheltered housing schemes.

2. Explore an exemplar PFI project that has been awarded prizes for its design quality, and reflect on the output specification and issues that determine quality.

3. Compare the process that could be adopted by North Tyneside MBC in their projects following study of the exemplar.

4. Appraise designs for the North Tyneside MBC sheltered housing schemes in relation to quality criteria.

This research was carried out with a metropolitan local authority in North East England, which is replacing its entire sheltered housing stock in one Private Finance Initiative project. The principal target of the local authority was that it should receive these buildings as assets, rather than liabilities, at the end of the 30-year period, when the project reaches maturity and the properties are handed back to the council. From its inception, the Private Finance Initiative approach has been criticised for lack of design quality in the buildings that it produced. The government became sufficiently concerned about this deficiency that it encouraged the Commission for Architecture and the Built Environment (CABE) and the Office of Government Commerce to develop recommendations to improve design quality, although it was greatly assisted by the 2004 EU Directive that enabled authorities to discuss all aspects of the proposals with the bidders.

North Tyneside Council was concerned that its new generation of sheltered housing might be criticised in this way, and therefore took the

recommendations of the government advisers on design quality seriously. The research demonstrates how the council followed the recommendations of government departments and advisers to establish an appropriate organisational structure for managing the process. The establishment of a new competitive dialogue procedure was arguably the biggest change in relationships with the bidders and this was perceived by all parties as crucially important. For the first time, a council's project team was able to discuss proposals with the bidders provided all were treated equally. However, it soon became clear that the deficiency in the process was how the designs would be evaluated. It was at this point that the objectives moved towards the search for a Design Quality Evaluation Tool. An exemplar scheme, Plas Y Mor at Burry Port, Swansea, West Glamorgan, was explored and it was concluded that, with some modification, the output specification formed a reliable overall structure and criteria for functional issues. However, a substantial number of issues regarding ambience and the qualities of homes were excluded.

A review of the existing evaluation tools revealed that they would not meet the specific requirements of the revised PFI procedure. Delays due to the government's Spending Review enabled sufficient time for a new evaluation tool to be developed. The new Tool is based on the hierarchical design quality model and generated mainly from academic literature. The intent was to inform the decision-making process in terms of selection of the preferred bidder, and to improve the design quality of all proposals. The Tool was progressively applied to the selection stages and the results offered clear direction as to where the designs could be improved. It also quantified the improvements to the refurbishment schemes in comparison with the existing ones, and provided invaluable data to assist the selection of the preferred bidder. The use of the Tool does not substantially add to the timeframe, as the official design and procurement process states that there should be an iterative form of analysis, synthesis and appraisal, in which data, ideas and options can be rigorously evaluated at all stages, thereby informing and justifying the key decisions which will need to be made in a sequential pattern as the design develops (Treasury Taskforce, 2007).

The results showed a significant improvement in design quality through the iterative process, although it was concluded that two reviews at Stage 3 were probably sufficient. They also revealed the potential for assessing the quality of existing buildings as a means of informing future redevelopment and refurbishment programmes. The Tool produced 156 evaluations from which clear patterns emerged. Nevertheless, the real outcome in relation to design quality will only be known when the buildings are completed and are in use.

5.5 Further Research

Opportunities for further research are primarily in three areas:

- Application of the Tool in other PFI sheltered housing projects
- Adaptation of the Tool for use in other building types, either PFI projects or other forms of procurement
- Post-occupancy evaluation

Application in other PFI sheltered housing projects will enable additional appraisals on the effectiveness of the Tool. Its use in other locations will contribute to feedback on its generic applicability. It may highlight adjustments that could be made and/or confirm the rigour of the evaluations. There has been dialogue with RIBA Enterprises (National Building Specification) about the use of the Tool on other building types. There is an opportunity to introduce variants for use on other building types, and a version for schools has already been discussed with another local authority. The favoured approach is to identify the generic core of the Tool as a replicable standard, and generate specific criteria tailored to the particular building types. This Tool was devised to suit the competitive dialogue phase of a PFI project. However, it does not necessarily need to be limited to that form of procurement.

The timescale of the construction phase of the project to replace the sheltered housing stock is such that this thesis has been completed before the designs will be built. The various delays to the project have meant that work only started on site in April 2014. Therefore, there is a prospect of undertaking post-occupancy evaluation and comparison with the assessment

grades offered by the developed Tool after the completion of this thesis, in accordance with the timetable below. The post-occupancy evaluation could provide reflections about use of the designed buildings from the perspectives of the residents and other users. This would also help to document how well the designed schemes satisfy users' needs in practice. In principle, the construction is organised into three groups of development, and this forms the basis of the proposed timescale for the post-occupancy evaluation.

Table 5.8: Proposed timescale for the post-occupancy evaluation

Phase	Group 1	Group 2	Group 3
On move in	March 2015	March 2016	March 2017
After 6 months	Sept 2015	Sept 2016	Sept 2017
After 12 months	March 2016	March 2017	March 2018

List of References

List of References

Adams, R.N. (1960) *Human organisation research: field relations and techniques*. Homewood, Illinois: Society of Applied Anthropology.

Agnew, J. and Duncan, J. (1989) *The Power of Place: Bringing together Geographical and Sociological Imaginations*. Boston, MA: Unwin Hyman.

Alexander, C., Ishikawa, S., Silverstein, M., Jacobson, M., Fiksdahl-King, I. and Angel, S. (1977a) *A pattern language: Towns, buildings, construction*. New York: Oxford University Press.

Alexander, C., Silverstein, M., Angel, S., Ishikawa, S. and Abrams, D. (1977b) *A pattern language*. Oxford: Oxford University Press.

Alexander, C. (1979) *The timeless way of building.* New York: Oxford University Press.

Alexander, C. (2000) *The Nature of Order*. New York, Oxford University Press.

Alexander, C. (2002) *The Nature of Order*. Berkeley, CA: Centre for Environmental Studies.

Alexander, C. (2002-05) *The Nature of Order* (4 volumes). Berkeley, CA: Center for Environmental Structure.

Altman, I. (1975) *The Environment and Social Behaviour Privacy, Personal space, Territory, Crowding*. Monterey, CA: Cole Publishing.

Altman, I. (1976) 'Privacy: a conceptual analysis', *Environment and Behavior*, 8, pp. 7-29.

Altman, I. (1977) 'Privacy regulation: Culturally universal or culturally specific?', *Journal of Social Issues*, 33 (3), pp. 66–84.

Altman, I. (1992) 'A transactional perspective on transitions to new environments', *Environment and Behavior*, 24 (2), pp. 268-280.

Altman, I. and Low, S. (eds.) (1992) 'Place attachment: a conceptual inquiry', in Altman, I. and Low, S.M. (eds.), *Place Attachment. Human Behavior and Environment: Advances in theory and research:* Vol.12. New York: Plenum Press, pp. 1–12.

Altman, I. and Rogoff, B. (1987) 'World views in psychology: Trait, interactional, organismic, and transactional perspectives', in Stokols, D. and Altman, I. (eds.), *Handbook of environmental psychology:* Vol. 1. New York: Academic Press, pp. 7–40.

Altman, I. and Werner, C. (eds.) (1985) *Home Environments*. New York: Plenum Press.

Altman, I. and Winsel, A. (1977) 'Personal space. An analysis of E.T. Hall's proxemics framework', in Altman, I., Wohlwill, J. (eds.), *Human Behavior and Environment: Advances in Theory and Research*: Vol. 2. New York: Plenum Press, pp. 181–259.

Altman, I. and Rogoff, B. (1987) 'World views in psychology: Trait, interactional, organismic, and transactional perspectives', in Stokols, D. and Altman, I. (eds.), *Handbook of environmental psychology:* Vol. 1. New York: Academic Press, pp. 7–40.

Akintoye, A. (1994) 'Design and build: a survey of construction contractors' views', *Construction Management and Economics*, 12(2), pp.155-163.

Appleyard, D. (1979) 'Home', *Architectural Quarterly*, 11(2), pp. 4–20.

Archea, J. (1977) 'The place of architectural factors in behavioral theories of privacy,' *Journal of Social Issues*, 33(3), pp. 116–137.

Ashford City Council (2008) *Ashford Extra Care Sheltered Housing: Design Specification,* [Online]. Available at: http://www.ashford.gov.uk/ sheltered-housing-in-ashford-borough (Accessed: 3 February 2009).

Association of Chief Police Officers Crime Prevention Initiatives (2004) *Secured by Design Principles, Sheltered Accommodation* [Online]. Available at: http://www.securedbydesign.com/pdfs/sheltered.pdf (Accessed: 3 February 2010).

Astron (2004) *Output Specification Building Our Future: Scotland's School Estate.* St Andrew's House, Edinburgh: Scottish Executive.

Barker, E.A. (2000) *Building Sight: A handbook of building and interior design solution to include the needs of visually impaired people*. London: RNIB.

Barlow, J. and Koberle-Gaiser, M. (2009) *Adaptability and Innovation in Healthcare Facilities: Lessons from the past for future Developments*, HaCCIRIC.

Barnes, S. (2006) 'Space, Choice and Control, and Quality of Life in Care Settings for Older People', *Environment and Behavior*, 38 (5), pp. 589–604.

Barnes, S. and Design in Caring Environments Study Group (2002) 'The design of caring environments and the quality of life of older people', Ageing and Society, 22(6), pp. 775–789.

Barnes, S., McKee, K.J., Morgan, K., Parker, C.J., Torrington, J.M. and Tregenza, P.R. (2001) 'The design in caring environments study', in Tester, S., Archibald, C., Rowlings, C. and Turner, S. (eds.) *Quality in Later Life: Rights, rhetoric and reality*. Proceedings of the British Society of Gerontology 30th Annual Conference, Stirling: University of Stirling, pp.172– 177.

Barnes, S., Torrington, J., Darton, R., Holder, J., Lewis, A., Mckee, K., Netten, A. and Orrell, A. (2011) 'Does the design of extra-care housing meet the needs of the residents? A focus group study', Ageing *and Society*, 32(7), pp. 1193-1214.

Baumeister, R.F. and Leary, M.R. (1995) 'The need to belong: desire for interpersonal attachments as a fundamental human motivation', *Psychological Bulletin*, 117(3), pp. 497–529.

BBH (Building Better Healthcare Awards) (2009) *Building Design Criteria,* [Online]. Available at: http://www.hpcimedia.com/conferences/ Building_Better_Healthcare (Accessed: 3 February 2013).

Beauchemin, K.M. and Hays, P. (1996) 'Sunny hospital rooms expedite recovery from severe and refractory depressions', *Journal of Affective Disorders*, 40(1–2), pp. 49–51.

Benjamin, D.N. (1995a) 'Introduction', in Benjamin, D.N. and Stea, D. (eds.) *The Home: Words, Interpretations, Meanings, and Environments*. Aldershot: Avebury, pp. 1–14.

Benjamin, D.N. (1995b) 'Afterword, or further research issues in confronting the home concept', in Benjamin, D.N. and Stea, D. (eds.) *The Home: Words, Interpretations, Meanings, and Environments*. Aldershot: Avebury, pp. 293–307.

Benjamin, D.N. and Stea, D. (1995) *The Home: Words, interpretations, meanings, and environments*, Aldershot: Avebury.

Berkman, L.F. and Kawachi, I. (2000) *Social Epidemiology*. Oxford: Oxford University Press.

Bernard, M., Bartlam, B., Sim, J. and Biggs, S. (2007) 'Housing and care for older people: life in an English purpose-built retirement village', *Ageing and Society*, 27(4), pp. 533–554.

Bernstein, R.J. (1976) *The Restructuring of Social and Political Theory*. Philadelphia: The University of Pennsylvania Press.

Bing, L., Akintoye, A., Edwards, P. J. and Hardcastle, C. (2005) 'The allocation of risk in PPP/PFI construction projects in the UK', *International Journal of Project Management*, 23 (1), pp. 25-35.

Blakstad, S., Olsson, N., Hansen, G. and Knudsen, W. (2010) 'Usability mapping tool', in Alexander, K. (ed.) *Proceedings of the Phase 3 CIB Report 330: Usability of Workplaces*, Rotterdam: pp. 17–29.

Blunt, A. and Dowling, R. (2006) *Home*. London: Routledge.

Bowling, A. (1995) 'The most important things in life: comparisons between older and younger population age groups by gender', *International Journal of Health Sciences*, 6, pp.169–175.

Bowling, A., Gabriel, Z., Dykes, J., Marriott-Dowding, L., Fleissig, A., Evans, O., Banister, D. and Sutton, S. (2003) 'Let's ask them: definitions of quality of life and its enhancement among people aged 65 and over', *International Journal of Aging and Human Development*, 56, pp.269–306.

Boyce, P.R. (2003) *Human Factors in Lighting*. 2nd edn. London: Taylor & Francis.

Brown, B.B. and Werner, C.M. (1985) 'Social cohesiveness, territoriality, and holiday decorations: the influence of cul-de-sacs', *Environment and Behavior,* 17(5), pp. 539–565.

Brownhill, D. and Rao, S. (2002) *A Sustainability Checklist for Developments: A Common Framework for Developers and Local Authorities*. Watford: BRE.

Brugha, C. (1998) 'Structuring and Weighting Criteria in Multi Criteria Decision Making (MCDM)', in Stewart, T.J. and Van den Honert, R.C. (eds) *Proceedings of the 13 International Conference on Multiple Criteria Decision Making*, Springer-Verlag, pp. 229-242.

Bryman, A. (2008) *Social research methods*. 3rd edn. Oxford: Oxford University Press.

Bryman, A. and Burgess, R.G. (1999) *Qualitative research*. London: SAGE.

Building Research and Information (BRI) (2001) '*Special issue on Post-occupancy Evaluation*', *Building Research and Information*', 29 (2), pp. 158-163.

Buttimer, A. (1980) 'Home reach and the sense of place', in Buttimer, A. and Seamon, D. (eds.), *The Human Experience of Space and Place*. London: Croom Helm.

Buttimer, A. and Seamon, D. (Eds.) (1980) *The human experience of space and place.* London: Croom Helm.

Burt, M.E. (1978) *BRE report: a survey of quality and value in building*. Watford: BRE Publications.

Burton, E. and Torrington, J. (2007) 'Designing environments suitable for older people', *CME Geriatric Medicine*, 9(2), pp. 39–45.

Butler, A., Oldman, C. and Greve, J. (1983) *Sheltered housing for the elderly: Policy, practice and the consumer*. London: Allen & Unwin.

CABE (2003) *Creating Excellent Buildings: A Guide for the Clients*. [Online]. Available at: http://webarchive.nationalarchives.gov.uk/20110118095356/http://www.cabe.org.uk/files/creating-excellent-buildings.pdf (Accessed: 12 May 2012).

CABE (2005a) *Evaluating housing proposals step by step.* [Online]. Available at: http://webarchive.nationalarchives.gov.uk/20110107165544/http://www.buildingforlife.org/publications/evaluating-housing-proposals (Accessed: 3 May 2012).

CABE (2005b) *Design Quality and the Private Finance Initiative.* London: The Commission for Architecture and the Built Environment.

CABE (2005c) *Better Neighbourhoods: Making higher densities work.* London: The Commission for Architecture and the Built Environment.

CABE (2006a) *Better Public Buildings.* London: The Commission for Architecture and the Built Environment.

CABE (2006b) *Design Review: How CABE evaluates quality in architecture and urban design.* London: The Commission for Architecture and the Built Environment.

CABE (2008) *Delivering great places to live: 20 questions you need to answer.* [Online]. Available at: http://webarchive.nationalarchives.gov.uk/20110107165544/http://www.buildingforlife.org/publications (Accessed: 3 February 2012).

CABE (2009a) *Homes for our old age: Independent living by design.* London: The Commission for Architecture and the Built Environment.

CABE (2009b) *Enabling design quality in Building Schools for Future: Leeds.* London: The Commission for Architecture and the Built Environment.

CABE (2009c) *Sustainable places for health and well-being*. London: Commission for Architecture and the Built Environment.

CABE (2009d) *Resident satisfaction with space in the home*. London: Commission for Architecture and the Built Environment.

CAE (Centre for Accessible Environments) and RIBA Enterprises (2004) *Designing for Accessibility.* [Online]. Available at: http://www.basingstoke.gov.uk/NR/rdonlyres/C53C7118-21A1-4A25-896E-D9726C992634/0/10983designforaccessibilityguideupdated.pdf (Accessed: 3 February 2009).

Canter, D. (1977a) *The Psychology of Place*. London: Architectural Press.

Canter, D. (1977b) 'Book review of E. Relph, "Place and placelessness"', *Environment and Planning B* (4), pp. 118–120.

Canter, D. (1983) 'The purposive evaluation of places—A facet approach', *Environment and Behaviour*, 15(6), pp. 659–697.

Canter, D. (1997) 'The facets of place', in Moore, G. T. and Marans, R. W. (eds.) *Advances in Environment, Behavior, and Design*, *Toward the Integration of Theory, Methods, Research, and Utilization*: V*ol. 4*. New York: Plenum, pp. 109–147.

Canter, S. and Canter, D. (1979) ‘Building for therapy’, in Canter, D. and Canter, S. (eds.) *Designing for Therapeutic Environments*. New York: John Wiley, pp. 1–28.

Care Services Improvement Partnership (CSIP) (2008) *More Choice, Greater Voice a toolkit for producing a strategy for accommodation with care for older people*. London.

Carmona, M. (2001) *Housing Design Quality: Through Policy, Guidance and Review*. London: Spon Press.

Casey, E. (1993) *Getting Back into Place*. Bloomington: Indiana Press.

Casey, E. (1997) *The Fate of Place: A philosophical history*. Berkeley: University of California Press.

Castro-Lacouture, D. and Ramkrishnan, K. (2008) ‘Fuzzy logic methods for measuring building quality’, *Journal of Quality*, 15(2), pp. 117–129.

Cavana, R. Y., Delahaye, B. L., and Sekaran, U. (2001) *Applied business research: Qualitative and quantitative methods (Australian ed.).* Milton, Queensland, Australia: J. Wiley.

Chalfont, G. (2005) ‘Creating enabling outdoor environments for residents’, *Nursing and Residential Care*, 7(10), pp. 454–457.

Chapman, T. and Hockey, J. (1999) *Ideal Homes? Social change and the experience of the home*. London: Routledge.

Colquhoun, I. (2004) *Design Out Crime: Creating safe and sustainable communities*. Amsterdam: Architectural Press.

Construction Industry Council (CIC) (2003) *Design Quality Indicator.* London: Construction Industry Council.

Construction Industry Council (CIC) (2010) *Design Quality Indicators for schools*. [Online]. Available at: www.cic.org.uk/services/ DQIforSchoolsresearchpublication.pdf (Accessed: 3 February 2012).

Cook, T. and Reichardt, C. (eds.) (1979) *Qualitative and Quantitative Methods in Evaluation Research*. Beverly Hills, CA: Sage.Cooper, C. (1976) 'The House as Symbol of the Self', in Proshansky, H.M., Ittelson, W.H. and Rivlin, L.G. (eds.) *Environmental Psychology: People and Their Physical Settings* (2nd ed.), New York: Holt, Rinehart, and Winston.

Cooper Marcus, C. (1974) 'The house as symbol of self', in Lang, J., Burnette, C., Moleski, W. and Vachon, D. (eds.) *Designing for Human Behaviour: Architecture and the Behavioural Sciences*. Stroudsberg, PA: Dowden, Hutchinson and Ross.

Cooper Marcus, C. (1995) *House as a Mirror of Self: Exploring the Deeper Meaning of Home*. Berkeley, CA: Conari Press.

Creswell, J. W. (2009) *Research design: qualitative, quantitative, and mixed methods approaches*. 3rd edn. Thousand Oaks, CA; London: Sage Publications.

Croucher, K., Pleace, N. and Bevan, M. (2003) *Living at Hartrigg Oaks: Residents' views of the UK's first continuing care retirement community*. York, UK: Joseph Rowntree Foundation.

Croucher, K., (2008) Housing Choices and Aspirations of Older People Research from the New Horizons Programme, Communities and Local Government (CLG), 2008.

Curtis, S., Gesler, W., Fabian, K., Francis, S. and Priebe, S. (2007) 'Therapeutic landscapes in hospital design: a qualitative assessment by staff and service users of the design of a new mental health inpatient unit', *Environment and Planning C: Government and Policy*, 25(4), pp. 591–610.

Davis, S.F. (2003) *Handbook of research methods in experimental psychology. Malden, Mass.* Oxford: Blackwell Pub., Blackwell handbooks of research methods in psychology.

Day, C. (2002) *Spirit and place: Healing our environment, healing environment*. Oxford: Architectural Press.

Day, C. (2004) *Places of the Soul: Architecture and environmental design as a healing art*. 2nd edn. Oxford: Architectural Press.

Day, K., Carreon, D. and Stump, C. (2000) 'The therapeutic design of environments for people with dementia: a review of the empirical research', *The Gerontologist*, 40(4), pp. 397–416.

De Vries, S., Verheij, R. A., Groenewegen, P. P., Spreeuwenberg, P. (2003) 'Natural environments healthy environments? An exploratory analysis of the relationship between green space and health', *Environment and Planning A* 35(10), pp.1717 –1731.

Defence Estates (2008) Better Defence Buildings DEEP User Guide.Department for Communities and Local Government (2007) *Homes for the future: more affordable, more sustainable.* London: The Stationery Office.

Department for Communities and Local Government (2008), *National Housing Strategy for an Ageing Society*. London: DCLG.

Department for Communities and Local Government (2009) *Multi-criteria analysis: a manual*. Wetherby: Communities and Local Government Publications.

Department for Social Development (Northern Ireland) (2011) *Specific Elderly Housing Design standards*. [Online]. Available at: http://www.dsdni.gov.uk/index/hsdiv-housing/ha_guide/hag-index/hagds-design-standards-contents.htm (Accessed: 8 June 2011).

Department of Health (2003) *Care Home for Older People: National Minimum Standards*. [Online]. Available at: http://www.dignityincare.org.uk/_library/Resources/Dignity/OtherOrganisation/CSCI_National_Minimum_Standards.pdf (Accessed: 3 February 2012).

Department of Health (2008) *Achieving Excellence Design Evaluation Toolkit Summary (AEDET)*. [Online]. Available at: http://www.wales.nhs.uk/sites3/Documents/254/AEDET_Evolution_promotional_booklet.pdf (Accessed: 16 June 2010).

Department of Transport (2005) *Inclusive Mobility*. [Online]. Available at: https://www.gov.uk/government/publications/inclusive-mobility (Accessed: 18 June 2009).

Deshpande, R. (1983) '"Paradigms Lost", On Theory and Method in Research in Marketing', *The Journal of Marketing*, 47 (4), pp. 101-110.

Design Excellence Evaluation Process (DEEP) Evaluation Record (2008).

Despres, C. (1991a) *Form, experience and meaning of home in shared housing*. Dissertation, University of Wisconsin, Milwaukee, UMI, Ann Arbor.

Despres, C. (1991b) 'The meaning of home: literature review and directions for future research and theoretical development', *Journal of Architectural and Planning Research*, 8(2), pp. 96–115.

DETR (1997) *Housing Quality Indicators: A feasibility study*. London: DETR.

Dixon, T., Pottinger, G. and Jordan, A. (2005) 'Lessons from the private finance initiative in the UK: Benefits, problems and critical success factors', *Journal of Property Investment and Finance*, 23(5), pp. 412-423.

Douglas, C.H. and Douglas, M.R. (2005) 'Patient-Centred Improvements in Healthcare Built Environments: Perspectives and Design Indicators', *Health Expectations*, 8(3), pp. 264-276.

Douglas, M. (1991) 'The Idea of a Home: A Kind of Space', *Social Research*, 58 (1), pp. 287–307.

Dovey, K. (1978) 'Home: an ordering principle in space', *Landscape*, 22(2), pp. 27–30.

Dovey, K. (1985) ‘Home and homelessness: introduction’, in Altman, I. and Werner, C.M. (eds.) *Home Environments.* Human Behaviour and Environment: Advances in theory and research: Vol. 8. New York: Plenum Press, pp. 33–64.

Duncan, J. and Duncan, N. (2001) ‘Sense of Place as a Positional Good: Locating Bedford in Place and Time,’ in Adams, P., Hoelscher, S. and Till, K. (eds.) *Textures of Place: Exploring Humanist Geographies*. Minneapolis: University of Minnesota Press, pp. 41–54.

Dupuis, A. and Thorns, D. (1996) ‘Meanings of Home for Older Home Owners’, *Housing Studies,* 11 (4), pp. 485-501.

Dupuis, A. and Thorns, D.C. (1998) ‘Home, Home Ownership and the Search for Ontological Security’, *Sociological Review*, 46 (1), pp. 24-47.

Egan, J. (1998) *Rethinking Construction, The Report of the Construction Task Force*. London: Department of Trade and Industry.

Eley, J. (2004) ‘Design Quality in Buildings’, *Building Research and Information*, 32(3), pp. 255-260.

Evans, S. (2009) *Community and Ageing: Maintaining quality of life in housing with care settings*. Bristol: Policy Press.

Evans, W. and Hartwich, O.M. (2005) *Unaffordable Housing: Fables and Myths.* London: Policy Exchange.

Fawsley S.J. (1997) ‘Introduction’, *Design Quality and the Private Finance Initiative.* London: Royal Fine Art Commission

Feldman, R.M. (1990) ‘Settlement-identity: psychological bonds with home places in a mobile society’, *Environment and Behavior*, 22(2), pp. 183-229.

Feldman, R. (1996) ‘Constancy and change in attachments to types of settlements’, *Environment and Behavior*, 28(4), pp. 419-445.

Field, E.M., Walker, M.H., Orrell, M.W. (2002) 'Social networks and health of older people living in sheltered housing', *Aging Mental Health*, 6(1), pp. 372-386.

Foddy, W. and Foddy, W. H. (1994) *Constructing questions for interviews and questionnaires: theory and practice in social research*. Cambridge niversity press.

Fox, M.T. and Gooding, B.A. (1998) 'Physical mobility and social interaction: their relationship to the well-being of older Canadians', *Canadian Journal on Aging,* 17(04), pp. 372-383.

Franklin, B.J. (2001) 'Discourses of Design: Perspectives on the Meaning of Housing Quality and "Good" Housing Design', *Housing, Theory and Society,* 18(1–2), pp. 79-92.

Fuhrer, U. and Kaiser, F. G. (1992) Bindung an das Zuhause: Die emotionalen Ursachen [Attachment to the home place: The emotional bases]. *Zeitschrift für Sozialpsychologie*, 23(2), pp.105-118.

Gann, D.M., Salter, A.J. and Whyte, J.K. (2003) 'Design Quality Indicator as a Tool for Thinking', *Building Research and Information,* 31(5), pp. 318–333.

Gesler, W. (1991) *The Cultural Geography of Health Care*. Pittsburgh, PA: University of Pittsburgh Press.

Gesler, W. (1992) 'Therapeutic landscapes: medical issues in light of the new cultural geography', *Social Science & Medicine*, 34(7), pp. 735–746.

Gesler, W. (1993) 'Therapeutic landscapes: Theory and a case study of Epidauros, Greece', *Environment and Planning D: Society and Space*, 11(2), pp. 171–189.

Gesler, W.M. (1996) 'Lourdes: healing in a place of pilgrimage', *Health and Place*, 2 (2), pp. 95–105.

Gesler, W. (1998) 'Bath's reputation as a healing place,' in Kearns, R. A. and Gesler, W. M. (eds.) *Putting health into place: Landscape, identity and well-being*. Syracuse: Syracuse University Press. pp. 17–35.

Gesler, W. (2003) *Healing Places*. Lanham, MD: Rowman and Littlefield.

Gesler, W. (2005) 'Therapeutic landscapes: an evolving theme', *Health and Place*, 11(4), pp. 295–297.

Gesler, W.M. (2009) 'Therapeutic landscapes', in Rob, K. and Nigel, T. (eds.), *International encyclopedia of human geography*, Oxford: Elsevier, pp. 229–230.

Gesler, W. and Kearns, R.A. (2002) *Culture/Place/Health*. London: Routledge.

Giddings, B. and Holness, A. (1996) 'Quality Assessment of Architectural Design and the Use of Design Award Schemes', *Environments by Design*, 1(1), pp. 53-68.

Gilbert, G.N. (2008) *Researching social life*. 3rd edn. Los Angeles: Sage.

Giuliani, M.V. (1991) 'Towards an analysis of mental representations of attachment to the home', *Journal of Architectural and Planning Research*, 8(2), pp. 133-146.

Giuliani, M.V. (2003) 'Theory of attachment and place attachment', in Bonnes, M., Lee, T. and Bonaiuto, M (eds.) *Psychological theories for environmental issues.* Aldershot: Ashgate, pp. 137–170.

Giuliani, M.V., and Feldman, R. (1993) 'Place attachment in a developmental and cultural context', *Journal of Environmental Psychology*, 13(3), pp. 267-274. Gold, R. L. (1958) 'Roles in sociological field observations', *Social Forces*, 36(3), pp. 217-223.

Goodman, C. (2011) Lifetime Homes Design Guide, IHSBRE Press.

Graham, B. (2005) *Research Interviewing*. Maidenhead: Open University Press.

Graney, M. (1975) 'Happiness and social participation in aging', *Journal of Gerontology*, 30(6), pp. 701-706.

Green Building Council of Australia (GBCA) (2009) *Green Star Multi residential v1: Tool Fact Sheet & Business Case.* [Online]. Available at: http://www.gbca.org.au/uploads/138/1930/MUST FactSheet 010709.pdf (Accessed: 3 February 2012).

Green Building Council of Australia (GBCA) (2011) *Evolution. A year in green building.* [Online]. Available at: http://www.gbca.org.au/uploads/30/13598/GBCA014_Evolution_Spreads_LoRes.pdf (Accessed: 3 February 2012).

Groak, S. (2001) 'Representaion in building', Construction Management and Economics, 19(1), pp.249-253.

Gurney, C. (1990) *The meaning of home in the decade of owner occupation: towards an experiential research agenda*. Working Paper 88. Bristol: SAUS Publications.

Gurney, C.M. (1997) '"… Half of me was Satisfied": Making Sense of Home Through Episodic Ethnographies', *Women's Studies International Forum*, 20(3), pp. 373–386.

Gurney, C. (2000) 'I *Love* Home: Towards a More Affective Understanding of Home', *Proceedings of Culture and Space in Built Environments: Critical Directions/New Paradigms*, pp. 33-39.

Halpern, D. (1995) *Mental Health and the Built Environment: More than Bricks and Mortar?.* London: Taylor and Francis.

Hanson, J. (1998) *Decoding Homes and Houses*. Cambridge: Cambridge University Press.

Hanson, J. (2001) *From Sheltered Housing to Life time Homes an Inclusive approach to housing*. London: University College London.

Hathaway, R.S. (1995) 'Assumptions underlying quantitative and qualitative research: Implications for institutional research', *Research in higher education*, 36(5), pp. 535-562.

Hay, R.B. (1990) *Sense of Place: Cross-cultural Perspectives from Banks Peninsula, New Zealand*, Ph.D. Dissertation. Department of Geography, University of Canterbury, Christchurch, New Zealand.

Hay, R. (1998a) 'Sense of place in developmental context', *Journal of Environmental Psychology*, 18(1), pp. 5–29.

Hay, R. (1998b) 'A rooted sense of place in cross-cultural perspective', *The Canadian Geographer*, 42(3), pp. 245–266.

Hayward D.G. (1975) 'Home as an environmental and psychological concept', *Landscape*, 20(1), pp. 2–9.

Hayward, D.G. (1977) *Psychological concepts of 'home'*. HUD Challenge, 10-13.

HCA (Homes and Communities Agency) (2007) *The Urban Design Compendium 2 second edition.* [Online]. Available at: http://www.made.org.uk/images/uploads/Urban-Design-Compendium-2.pdf (Accessed: 21 October 2009).

HCA (Homes and Communities Agency) (2009) *Housing our Ageing Population: Panel for Innovation (HAPPI) Report*. London: Homes and Communities Agency.

Heidegger, M. (1962) *Being and time*. (Orig. publ. 1927). New York: Harper and Row.

Heidegger, M. (1971) *Building, Dwelling, Thinking* (trans. Hofstadter, A.), Poetry, Language, Thought. New York: Harper and Row.

Heidegger, M. (1977) 'Building Dwelling and Thinking', in Krell, D. F. (ed.) *Martin Heidegger: Basic Writings*. New York: Harper and Row, pp. 319–340.

Heidegger, M. (1993) 'Building, dwelling, thinking', in Krell, D. F. (ed.) *Martin Heidegger: Basic Writings*. London: Routledge, pp. 361–362.

Hertzberger, H. (1998) *Lessons for Students in Architecture*. 3rd edn. Rotterdam: Uitgeverij.

Hertzberger, H. (2000) *Space and the Architect: Lessons in architecture 2*. Rotterdam: Uitgeverij.

Hillier, B. and Hanson, J. (1984), The social logic of space. Cambridge: Cambridge University Press.

HM Treasury (1998) *Practical Guidance to the Private Finance Initiative: Writing an Output Specification, Private Finance Panel.* London: HMSO.

Horwitz, J. and Tognoli, J. (1982) 'Role of home in adult development: Women and men living alone describe their residential history', *Family Relations*, 31(1), pp. 335–341.

Housing Corporation (2007a) *Design and quality standards*. London: Housing Corporation.

Housing Corporation (2007b) *Housing Quality Indicators Version 4.* [Online]. Available at: http://www.housingcorp.gov.uk/upload/pdf/HQIFormv4_Apr_2007.pdf (Accessed: 30 October 2009).

Housing Corporation (2008a) *Achieving Building for Life.* London: Housing Corporation.

Housing Corporation (2008b) *721 Housing Quality Indicators (HQI) Form*. London: National Affordable Homes Agency.

Housing LIN (Housing Learning and Improvement Network) (2008a) *Design Principles for Extra Care.* [Online]. Available at: http://www.dhcarenetworks.org.uk/_library/Resources/Housing/Housing_advice/Design_Principles_for_Extra_Care_July_2004.pdf (Accessed: 30 November 2009).

Housing LIN (2008b) *Remodelling sheltered Housing and Residential Care Homes to Extra Care Housing*. [Online]. Available at: http://www.housinglin.org.uk/Topics/browse/HousingExtraCare/Commissioning/Remodelling/?parent=1008&child=2540 (Accessed: 30 October 2009).

Hughes, N. (2012) A better fit? Creating housing choices for an ageing population. [Online]. Available at: https://england.shelter.org.uk/__data/assets/pdf_file/0005/427730/Policy_report_A_better_fit.pdf (Accessed: 27 November 2014).

Hummon, D.M. (1992) 'Community attachment: local sentiment and sense of place', in Altman, I. and Low, S. (eds.) *Place Attachment*. Human Behavior and Environment: Advances in theory and research: Vol. 12. New York: Plenum Press, pp. 253–278.

Hurst, W. (2007) *Fraser quits A&DS in PFI protest.* [Online]. Available at: http://www.bdonline.co.uk/fraser-quits-ads-in-pfi-rotest/3081147.article (Accessed: 14 June 2009).

Jorgensen, D.L. (1989) *Participant observation: A methodology for human studies.* London: Sage.

Joseph Rowntree Foundation (1997) *Designing Lifetime Homes*. York: Joseph Rowntree Foundation.Kearns, A. et al., (2000) 'Beyond four walls': the psycho-social benefits of home: Evidence from West Central Scotland', *Housing Studies*, 15(3), pp. 387–410.

Kearns, R.A. and Gesler, W.M. (1998) *Putting health into place: Landscape, identity and well-being*. New York: Syracuse University Press.

Keeney, R.L. and Raiffa, H. (1993) *Decisions with Multiple Objectives: Preferences and Value Tradeoffs*. Cambridge: Cambridge University Press.

Khadaroo, I. and Abdullah, A. (2007) 'Private Finance Initiative (or Public Private Partnership) Implementation Processes and Perception of Value for Money', *Int. Journal of Economics and Management*, 1(3), pp. 407–435.

Lacey, A. (2004) *Designing for Accessibility- an essential guide for public buildings.* London: Centre for Accessible Environments and RIBA Enterprises.

Lawrence, D.L. and Low, S. M. (1990) 'The built environment and spatial form', Annual Review, *Anthropology*, 19(1), pp. 453–505.

Lawrence, R.J. (1987a) 'What makes a house a home?', *Environment and Behavior*, 19(2), pp.154–168.

Lawrence, R.J. (1987b) *Housing, Dwellings and Homes: Design Theory, Research and Practice*. Brisbane: Wiley.

Lawrence, R.J. (1995) 'Deciphering home: an intergrative historical perspective', in Benjamin, D.N. and Stea, D. (eds.) *The Home: Words, Interpretations, Meanings, and Environments*. Aldershot: Avebury, pp. 53–68.

Lawrence, R. (2002) 'What makes a house a home?', in Garciá-Mira, R., Sabucedo, J.M. and Romay, J. (eds.) *Culture, Quality of Life - Problems and Challenges for the New Millennium* (IAPS 17 Conference Proceedings), pp. 689-690.Lawson, B, (2001) *The Language of Space*. Oxford: Architectural Press.

Lawson, B. (2003) *How Designers Think.* Oxford: Architectural Press.

Lawson, B. (2005) *The Language of Space.* Oxford: Architectural Press.

Lawson, B., Phiri, M., Wells-Thorpe, J., (2003) *The Architectural Healthcare Environment and its Effect on Patient Health Outcomes.* London: TSO.

Lawson, B., Worthington, J., Phiri, M. and Bassanino, M. (2002) *Learning from Experience: Applying Systematic Feedback to Improve the Briefing Process in Construction.* Sheffield: University of Sheffield.

Lawton, M.P. (1980) *Environment and Aging.* Monterey, CA: Brooks/Cole.

Lawton, M.P. (1982) 'Competence, environmental press, and the adaptation of older people', in Lawton, M.P., Windley, P.G. and Byerts, T.O. (eds.) *Aging and the Environment: Theoretical approaches*. New York: Springer, pp. 33–59.

Lawton, M.P. (1985) 'The elderly in context: perspectives from environmental psychology and gerontology', *Environment & Behavior*, 17(4), pp. 501–519.

Lawton, M.P. (1987) 'Environment and the need satisfaction of the aging', in Carstensen, L.L. and Edelstein, B.A. (eds.) *Handbook of Clinical Gerontology*. New York: Pergamon Press, pp. 33–40.

Lawton, M.P. (1989a) 'Environmental proactivity in older people', in Bengtson, V.L. and Schaie, K.W. (eds.) *The course of later life.* New York: Springer, pp. 15–23.

Lawton, M.P. (1989b) 'Three functions of the residential environment', in Pastalan, L.A. and Cowart, M.E. (eds.) *Lifestyles and housing of older adults: The Florida experience.* New York: Haworth, pp. 35–50.

Lawton, M.P. (1990) 'Residential Environment and Self-Directedness among Older People', *American Psychologist*, 45 (5), pp. 638–640.

Lawton, M.P. (1994) 'Quality of life in Alzheimer's disease', *Alzheimer's Disease and Associated Disorders*, 8(3), pp. 138–150.

Lawton, M.P. (1998) 'Environment and aging: theory revisited', in Scheidt, R. J. and Windley, P. G. (eds.), *Environment and Aging Theory: A focus on housing*. Westport, CT: Greenwood Press, pp.1–31.

Lawton, M.P. (2001) 'The physical environment of the person with Alzheimer's disease', *Aging & Mental Health*, 5(S1), pp. 56–64.

Lawton, M.P., Weisman, G., Sloane, P., Norris-Baker, C., Calkins, M. and Zimmerman, Z.I. (2000) 'A "Professional Environmental Assessment Procedure" for special care units for elders with dementing illness and its relationship to the "Therapeutic Environment Screening Schedule"', *Alzheimer's Disease and Associated Disorders*, 14(1), pp. 28–38.

Le Corbusier (1923) *Towards a New Architecture* (trans. F. Etchells). Reprint edn. London: Architecture Press, 1946.

Lee, W. L. and Burnett, J. (2008) 'Benchmarking energy use assessment of HK-BEAm, BREEAM and LEED', *Building and Environment,* 43(11), pp. 1882–1891.Leino-Kilpi, H., Valimaki, M., Dassen, M., Gasull, C., Lemonidou, C., Scott, A., et al. (2001) 'Privacy: a review of the literature', *International Journal of Nursing Studies*, 38, pp. 663–671.

Lewis, A., Torrington, J., Barnes, S., Darton, R., Holder, J., McKee, K., Netten, A. and Orrell, A. (2010) 'EVOLVE: A Tool for Evaluating the Design of Older People's Housing', *Housing Care and Support*, 13(3), pp. 36–41.

Leyden, K.M. (2003) 'Social capital and the built environment: the importance of walkable neighbourhoods', *American Journal of Public Health*, 93, pp. 1546–1551.

Lifetime Homes (2008) *Lifetime Neighbourhoods: A National Strategy for Housing in an Ageing Society*'. Wetherby: Communities and Local Government Publications.

Low, S. (1987) 'Development in Research Design, Data Collection, and Analysis: Qualitative Methods', in Zube, E. H. And Moore, G. T. (eds.) *Advances in environment, behavior, and design: Vol.1.* New York: Plenum, pp. 251-277.

Low, S.M. (1992) 'Symbolic ties that bind: place attachment in the plaza', in Altman, I. and Low, S.M. (eds.) *Place Attachment. Human Behavior and Environment: Advances in theory and research:* Vol.12. New York: Press, pp. 165–185.

Low, S.M. (2003) *Behind the Gates. Life, Security and the Pursuit of Happiness in Fortress America*. New York: Routledge.

Low, S.M. (2008) 'Fortification of Residential Neighbourhoods and the New Emotions of Home', *Housing, Theory and Society*, 25(1), pp. 47–65.

Low, S. and Smith, N. (2006) *The Politics of Public Space*. New York: Routledge.

Macmillan, S. (ed.) (2004) *Designing Better Buildings*. London: E&FN Spon.

Macmillan, S. (2005) 'The valuation of intangibles', *RIBA Journal*, 112(9) (Practice Supplement), x.

Macmillan, S. (2006) 'Added value of good design', *Building Research and Information*, 34(3), pp. 257–271.

Madigan, R., Munro, M. and Smith, S.J., (1990) 'Gender and the meaning of the home', *International Journal of Urban and Regional Research*, 14(4), pp. 625–647.

Mallett, S. (2003) *Conceiving Cultures: Reproducing people and Places on Nuakata, Papua New Guinea*. Ann Arbor, MI: University of Michigan Press.

Mallett, S. (2004) 'Understanding home: a critical review of the literature', *The Sociological Review*, 52(1), pp. 62–89.

Manning, P. (1991) 'Environmental aesthetic design: identifying and achieving environmental effects, particularly "image" and atmosphere', *Building and Environment,* 26 (4), pp. 331–340.

Marcus, C.C. (1976) 'The house as symbol of self', in Ittelson, W.H., Rivlin, R. G. and Proshansky, H. (eds.) *Environmental Psychology.* New York: Holt, Rinehart and Winston, pp. 435–448.

Marcus, C.C. (1995) *House as a mirror of self*. Berkeley, CA: Conari Press.

Marcus, C.C. (1997) *House as a Mirror of Self: Exploring the Deeper Meaning of Home.* New York: Conari Press.

Markus, T.A. (2003) 'Lessons from the Design Quality Indicator', *Building Research and Information*, 31(5), pp. 399–405.

Maslow, A. (1954) *Motivation and Personality*. New York: Harper and Row.

Maslow, A. (1968) *Towards a Psychology of Being*. New York: Van Nostrand Reinold.

Massey, D. (1992) 'A Place Called Home', *New Formations*, 7(1), pp. 3–15.

Massey, D. (1994) *Space, Place and Gender*. Cambridge: Polity.

Massey, D. (1995) 'The conceptualization of place', in Massey, D. and Jess, P. (eds.) *A Place in the World? Places, Cultures and Globalization*. Oxford: Oxford University Press, pp. 45–85.

Massey, D. (1997) 'A Global Sense of Place', in Barnes, T. and Gregory, D. (eds.) *Reading Human Geography*. London: Arnold, pp. 315–323.

Massey, D. (2005) *For space*. London: Sage.

Massey, D. and Jess, P. (1995) 'Places and cultures in an uneven world', in Massey, D. and Jess, P. (eds.) *A Place in the World?: Places, Cultures and Globalization*. Oxford: Oxford University Press, pp. 215–239.

Maurer, T. and Andrews, K. (2000) 'Traditional, Likert and Simplified Measures of Self-efficacy', *Educational and Pschological Measurement*, 60(6), pp. 965–973.

Max-Neef, M. (1991) *Human-scale Development: Conception, application and further reflection*. New York: Apex Press.

Max-Neef, M. (1992) 'Development and human needs', in Ekins, P. and Max-Neef, M. (eds.) *Real-life Economics: Understanding wealth creation*. London: Routledge, pp. 197–214.

Maxwell, J. (2005) *Qualitative Research Design: An Interactive Approach*. London: SAGE Publications.

Miller, D.C. and Salkind, N.J. (2002) *Handbook of Research Design and Social Measurement.* 6th edn. London: Sage Publications Inc.

Moore, J. (1998) *The placing of home*. Doctoral thesis. University of Liverpool.

Moore, J. (2000a) 'Placing home in context', *Journal of Environmental Psychology*, 20(3), pp. 207–218.

Moore, J. (2000b) 'Health and home for homeless people in transition', *Reviews on Environmental Health*, 15(12), pp.135–148.

Moore, J. and Canter, D. (1991) 'Home on the street: An exploration of street homelessness in London', in Bonnes, M. (ed.) *Perception and evaluation of the quality of the urban environment: Toward integrated approaches in the European context*. MAB-UNESCO Project 11. Rome: UNESCO.

Moore, J., and Canter, D. (1993) 'Home and homelessness', in Bulos, M. and Teymur, N. (eds.) *Housing, design, research, education*. Ethnoscapes Series. London: Avebury.

Moore, J., Canter, D., Stockley, D. and Drake, M. (1995) *The faces of homelessness in London*. Aldershot: Dartmouth.

Moore, R.L. and Graefe, A.R. (1994) 'Attachments to recreation settings: the case of rail-trail users', *Leisure Sciences*, 16(1), pp. 17–31.

Mullins, L. and Dugan, E. (1990) 'The influence of depression, and family and friendship relations, on residents' loneliness in congregate housing', *The Gerontologist,* 30(3), pp. 377–384.

National Housing Federation (1998) *Standards and quality in development: A good practice guide*. London: National Housing Federation.

Nau, D. (1995) 'Mixing methodologies: can bimodal research be a viable post-positivist Tool?', *The Qualitative Report*, *2*(3), pp. 1-5.

Neuman, W.L. (2000) *Social Research Methods: Qualitative and Quantitative Approaches.* USA: Allyn & Bacon.

Newell, P.B. (1994) 'A Systems Model of Privacy', *Journal of Environmental Psychology*, 14(1), pp. 65–78.

Newell, P.B. (1995) 'Perspectives on privacy', *Journal of Environmental Psychology,* 15(2), pp. 87–104.

Newman, O. (1972) *Defensible Space: Crime Prevention Through Urban Design.* New York: Macmillan.

Newman, O. (1973) *Defensible Spaces: People and Design in the Violent City.* London: Architectural Press.

Newman, O. (1996) *Creating Defensible Space*. Washington, DC: US Department of Housing and Urban Development, Office of Policy Development and Research.

Nezlek, J.B. (2001) 'Causal relationships between perceived social skills and day-to-day social interaction: Extending the sociometer hypothesis', *Journal of Social and Personal Relationships,* 18(3), pp. 386–403.

Nezlek, J.B., Imbrie, M. and Shean, G.D. (1994) 'Depression and everyday social interaction', *Journal of Personality and Social Psychology*, 67(6), pp. 1101–1111.

Nezlek, J.B. and Reis, H.T. (1999) 'Causal relationships between quality and quantity of social interaction and psychological wellbeing', *International Network on Personal Relationships Conference*, Louisville, KY, June.

Nezlek, J.B., Richardson, D.S., Green, L.R. and Schatten-Jones, E.C. (2002) 'Psychological wellbeing and day-to-day social interaction among older adults', *Personal Relationships,* 9(1), pp. 57–71.

Nocon, A. and Pleace, N. (1999) 'Sheltered housing and community care', *Social Policy Administration*, 33(1), pp. 164–180.

Noor, K. B. M. (2008) 'Case Study: A Strategic Research Methodology', *American Journal of Applied Sciences*, *5*(11), pp. 1602-1604.Norberg-Schulz, C. (1965) *Intentions in Architecture*. Cambridge: MIT Press.

Norberg-Schulz, C. (1971) *Existence, space and architecture*. New York: Praeger.

Norberg-Schulz, C. (1979) *Genius Loci: Towards a phenomenology of architecture*. New York: Rizzoli International.

North Tyneside Council (2006) Planning for all of our tomorrows: Growing older in North Tyneside.

North Tyneside Council (2007) *Housing Strategy 2006-2010.* Killingworth: Housing Support and Development.

North Tyneside Council (2008) *Invitation to Submit Detailed Solutions, Output Specification*. Killingworth: North Tyneside Council.

North Norfolk Design Guide (2008) [Online]. Available at: http://www. northnorfolk.org/files/North_Norfolk_Design_Guide_Adopted_ 2008_(WEB).pdf (Accessed: 10 January 2012).

Office of Government Commerce (2006) *Competitive Dialogue Procedure*. London: Office of Government Commerce.

Office of Government Commerce (2007) *Design Quality: Achieving Excellence in Construction Procurement Guide*. London: Office of Government Commerce,.

Older Persons Housing Design: A European Good Practice Guide (2007) [Online]. Available at: http://www.brighton-hove.gov.uk/sites/brighton-hove.gov.uk/files/downloads/02_-_Introduction.pdf (Accessed: 7 July 2010).

Oswald, L. (2003) 'Branding the American family: a strategic study of the culture, composition and consumer behaviour of the families in the new millennium', *The Journal of Popular Culture*, 37(2), pp. 309–335.

Oswald, F. and Wahl, H. W. (2005) 'Dimensions of the meaning of home in later life', in Rowles, G. D. and Chaudhury, H. (eds.) *Home and Identity in Late Life: International perspectives*. New York: Springer, pp. 21–45.

Parker, C., Barnes, S., McKee, K., Morgan, K., Torrington, J. and Tregenza, P. (2004) 'Quality of life and building design in residential and nursing homes for older people', *Ageing and Society*, 24(6), pp. 941–962.

Passini, R. (1999) 'Wayfinding design: logic, application and some thought on universality', *Design Studies*, 17(3), pp. 319–331.

Passini, R., Pigot, H., Rainville, C. and Tetreault, M. H. (2000) 'WayFinding in a nursing home for advanced dementia of the Alzheimer's type', *Environment and Behavior*, 32(5), pp. 684–710.

Passini, R., Rainville, C., Marchand, N. and Joanette, Y. (1998) 'WayFinding and dementia: some research Findings and a new look at design', *Journal of Architectural Planning and Research*, 15(2), pp. 133–151.Pateman, J. (1986) Giving the Building Owner Quality. *Building Technology and Management,* August/September, 26-28.

Philips, D. (1983) 'Postpositivistic education thought', *Educational Research*, 12(5), pp.4-12.

Phillips, D.T. (1992) *Lincoln on Leadership: Executive strategies for tough times*. New York: Warner Books.

Porteous, D. (1976) 'Home: the territorial core', *Geographical Review*, 66(4), pp. 383–390.

Porteous, J. and Smith, S. (2001) *Domicide: The Global Destruction of Home*. Montreal: McGill-Queen's University Press.

Proshansky, H.M. (1978) 'The city and self-identity', *Environment and Behavior*, 10(2), pp. 147–169.

Proshansky, H.M., Fabian, A.K. and Kaminoff, R. (1983) 'Place identity: physical world socialization of the self', *Journal of Environmental Psychology*, 3(1), pp. 57–83.

Proshansky, H.M., Ittelson, W.H. and Rivlin, L.G. (1970) 'Freedom of choice and behavior in a physical setting', in Proshansky, H., Ittelson, W., Rivlin, L. (eds.) *Environmental Psychology: Man and His Physical Setting*. Holt, Rinehart and Winston, New York, pp. 173–183. Purves, G. (2009) *Primary Care Centres: A Guide to Health Care Design*. Oxford: Architectural Press.

Rahman, S (2014) Is it "ageist" to suggest 'downsizing' to promote wellbeing in older people with dementia living independently?. Available at: http://livingwelldementia.org/2014/01/26/downsizing-dementia-housing/ (Accessed: 20 November 2014).

Rapoport, A. (1969) *House form and culture.* Englewood Cliffs, NJ: Prentice Hall.

Rapoport, A. (1980) 'Towards a cross-culturally valid definition of housing', in Stough, R.R. and Wandersman, A. (eds.) *Optimizing environments—research, practice and policy*, EDRA 11. Washington, DC: EDRA.

Rapoport, A. (1982) *The meaning of the built environment: A nonverbal communication approach*. Newborn Park, CA: Sage.

Rapoport, A. (1985) 'Thinking about home environments: a conceptual framework', in Altman, I. and Werner, W.C. (eds.) *Home Environments.* Human Behavior and Environment: Advances in theory and research: Vol.8. New York: Plenum Press, pp. 255–286

Rapoport, A. (1988) 'Levels of meaning in the built environment', in Poyatos, F. (ed.) *Cross-cultural perspectives in nonverbal communication.* Toronto: Hogrefe, pp. 317–336.

Rapoport, A. (1990a) *The meaning of the built environment*. (2nd ed.). Tucson, AZ: University of Arizona Press.

Rapoport, A. (1990b) 'Systems of activities and systems of settings', in Kent, S. (ed.) *Domestic Architecture and the Use of Space*. Cambridge: Cambridge University Press, pp. 9–20.

Rapoport, A. (1995) ‘A critical look at the concept “Home”, in Benjamin, D.N. and Stea, D. (eds.) *The Home: Words, interpretations, meanings, and environments*. Aldershot: Avebury, pp. 25–52.

Rapoport, A. (1998) ‘Using ‘culture’ in housing design’, *Housing and Society*, 25 (1–2), pp. 1–20.

Reeves, T. C. and Hedberg, J. G. (2003) *Interactive learning systems evaluation*. Englewood Cliffs, NJ: Educational Technology Publications.

Relph, E. (1976) *Place and Placeless*. London: Pion.

Relph, E. (1978) ‘Book review of D. Canter, “The psychology of place”’, *Environment and Planning A*, 10, pp. 237–238.

Relph, E. (1981) *Rational Landscapes and Humanistic Geography*. New York: Barnes and Noble.

Relph, E. (1993) ‘Modernity and the Reclamation of Place’, in Seamon, D. (ed.) *Dwelling, Seeing, and Designing: Toward a phenomenological ecology.* Albany, NY: SUNY Press, pp. 25–40.

Reschovsky, J.D., Newman, S.J. (1991) ‘Home upkeep and housing quality of older homeowners’, *Journal of Genrontology*, 46(5), pp. 288–297.

Rivlin, L.G. (1987) ‘The neighborhood, personal identity, and group affiliations’, in Altman, I. and Wandersman, A. (eds.) *Neighborhoods and community environments.* Hillsdale, NJ: Erlbaum, pp. 1–34.

Rivlin, L. (1990) ‘The significance of home and homelessness’, *Marriage and Family Review*, 15(1), 39–56.

Rivlin, L. (1996) ‘Evolving conceptions of home: The rehousing experiences of formerly homeless families.’ *Paper prepared for the International Association for People-Environment Studies (IAPS)*, Stockholm, Sweden.

Rivlin, L.G., and Moore, J. (2001) 'Home-making: Supports and barriers to the process of home', *Journal of Social Distress and the Homeless*, 10(4), pp. 323–336.

Robinson, G. (1998) *Speech at the Private Finance Initiative Conference,* 27 April.

Ronn, Magnus (2011) 'Architectural quality in competitions', *FORMakademisk,* 4(1), pp.100-115.

Rowles, G.D. (1980) 'Toward a geography of growing old', in Buttimer, A. and Seamon, D. (eds.) *The human experience of space and place*. London: Croom Helm, pp. 55–72.

Rowles, G.D. (1983) 'Place and personal identity in old age: Observations from Appalachia', *Journal of Environmental Psychology*, 3(1), pp. 299-313.

Rowles, G.D. and Ravdal, H. (2001) 'Aging, place and meaning in the face of changing circumstances', in Weiss, R. and Bass, S. (eds.) *Challenges of the Third Age: Meaning and purpose in later life*. New York: Oxford University Press, pp. 81–114.

Rowles, G.D. and Watkins, J. F. (2003). 'History, habit, heart and hearth: on making spaces into places', in Schaie, K.W., Wahl, H.W., Mollenkopf, H. and Oswald, F. (eds.) *Aging Independently: Living arrangements and mobility*. New York: Springer, pp. 77–96.

Ruane, J.M. (2004) *Essentials of research methods: a guide to social science research.* Malden, Mass.; Oxford: Blackwell.

Rubinstein, R.L. (1989) 'The home environments of older people: Psychosocial processes relating person to place', *Journal of Gerontology*, 44(2), pp. S45–S53.

Rubinstein, R.L. (1990) 'Personal identity and environmental meaning in later life', *Journal of Aging Studies*, 4(2), pp. 131–147.Rubinstein, R.L. and de Medeiros, K. (2004) 'Ecology and the aging self', in Wahl, H.W., Scheidt, R.J. and Windley, P.G. (eds.) *Annual review of gerontology and geriatrics: Focus on aging in context: Socio-physical environment.* New York: Springer, pp. 59–84.

Rubinstein, R. L., and de Medeiros, K. (2005) 'Home, self and identity', in Rowles, G. D. and Chaudhury, H. (eds.) *Home and identity in late life: International perspectives*. New York: Springer Publishing Company, pp. 47-62.

Rubinstein, R.L. and Parmelee, P.A. (1992) 'Attachment to place and the representation of the life course by the elderly', in Altman, I. and Low, S. M. (eds.) *Place attachment: Human behavior and the environment: Advances in theory and research*. New York: Plenum Press, pp. 139–163.

Rubinstein, N. (1993) 'There's no place like home: home as trauma: lessons of the unspoken', in Feldman, R., Hardie, G. and Saile, D. (eds.) *Power by Design.* The proceedings of the Twenty-fourth of the Environmental Design Research Association. Oklahoma City: EDRA Press, pp. 267–272.Saunders, P. (1989) 'The Meaning of "Home" in Contemporary English Culture', *Housing Studies*, 4(3), pp.177–192.

Saunders, P. (1990) *A Nation of Home Owners*. London: Unwin-Hyman.

Saunders, P. and Williams, P. (1988) 'The Constitution of the Home: Towards a Research Agenda', *Housing Studies*, 3 (2), pp. 81–93.

Saunders, T. (2008) *A discussion document comparing international Environmental Assessment Methods for Buildings*. [Online]. Available at: http://www.dgbc.nl/images/uploads/rapport_vergelijking.pdf (Accessed: 4 January 2012).

Savage, L.J. (1954) The Foundations of Statistics, John Wiley, New York.

Seamon, D. (1979) *A Geography of the Lifeworld: Movement, Rest, and Encounter*. New York: St. Martin's Press.

Seamon, D. (1980) 'Body-subject, time-space routines, and place-ballets', In Buttimer, A. and Seamon, D. (eds.) *The human experience of space and place*. New York: St. Martin's Press, pp. 148–165.

Seamon, D. (1984) 'Emotional experience of the environment', *American Behavioral Scientist*, 27(6), pp. 757–770.

Seamon, D. (2000) 'A Way of Seeing People and Place: Phenomenology', in Wapner, S., Demick, J., Yamamoto, T. and Minami, H. (eds.) *Theoretical Perspectives in Environment-Behavior Research.* New York: Plenum Press. pp. 157–178.

Seamon, D. and Mugerauer, R. (Eds.) (1985) *Dwelling, place and environment*. New York: Columbia University Press.

Serginson, M., Giddings, B., Ladinski, V. and Messer, S. (2012) 'Assessing Effectiveness of Architectural Design Communication through Public Participation Methods', *The International Journal of Design Management and Professional Practice*, 6, xx-yy.

Shaw, E. (2007) *Losing Labour's Soul? New Labour and the Blair Government 1997-2007.* London: Routledge.

Shorrock, L.D. and Anderson, B.R. (1995) *A guide to the development of the Building Research Establishment Domestic Energy Model (BREDEM).* Watford: BRE Press.

Shumaker, S.A., and Taylor, R.B. (1983) 'Toward a clarification of people-place relationships: A model of attachment to place', in Feimer, N.R. and Geller, E.S. (eds.) *Environmental psychology: Directions and perspectives.* New York: Praeger, pp. 219–251.

Sinou, M. and Kyvelou, S. (2006) 'Present and future of building performance assessment tools', *Management of Environmental Quality*, 17 (5), pp. 570–586.

Sixsmith, A.J. (1990) 'The meaning and experience of "home" in later life', in Bytheway, W.R., Johnson, J. and British Society of Gerontology (eds.) *Welfare and the Ageing Experience: A multidisciplinary analysis*. Aldershot: Avebury, pp. 172–209.

Sixsmith, A.J., Gibson, G., Orpwood, R.D. and Torrington, J.M. (2007) 'Developing a technology "wish-list" to enhance the quality of life of people with dementia', *Gerontechnology*, 6(1), pp. 2–19. [Online]. Available at: DOI: http://gerontechnology.info/index.php/journal/article/view/gt.2007.06.01.002.00 (Accessed: 7 July 2011).

Sixsmith, A. and Sixsmith, J. (1991) 'Transitions in home experience in later life', *Journal of Architectural and Planning Research*, 8(3), pp. 181–191.

Sixsmith, J. (1986) 'The meaning of home: an exploratory study of environmental experience', *Journal of Environmental Psychology*, 6(4), pp. 281–298.

Sixsmith, J. (1992) *Person Place Transactions: A study of Place Meanings and Usage in Unemployment*. PhD Thesis. University of Surrey, Guildford.

Smith, S.G. (1994) 'The Essential Qualities of a Home', *Journal of Environmental Psychology*, 14(2), pp. 31–46.

Somerville, P. (1992) 'Homelessness and the meaning of home: rooflessness or rootlessness?', *International Journal of Urban and Regional Research*, 16(4) pp. 529–539.

Somerville, P. (1997) 'The social construction of home', *Journal of Architecture and Planning Research*, 14(3), pp. 226–245.

Starrs, M. (2010) BREEAM 2008 vs. LEED 2009 – introduction. [Online]. Available at: http://www.melstarrs.com/elemental/2010/01/18/breeam-2008-vs-leed-2009-introduction/ (Accessed: 4 January 2012).

Stedman, R.C. (2002) 'Toward a social psychology of place: predicting behavior from place-based cognitions, attitude, and identity', *Environment and Behavior,* 34(5), pp. 561–581.

Stedman, R.C. (2003) 'Sense of place and forest science: Toward a program of quantitative research', *Forest Science*, 49(6), pp. 822–829.

Stedman, R.C. (2003) 'Is it really just a social construction? The contribution of the physical environment to sense of place', *Society and Natural Resources: An International Journal*, 16(80), pp. 671–685.

Stedman, R., Beckley, T., Wallace, S. and Ambard, M. (2004) 'A picture and 1000 words: Using resident-employed photography to understand attachment to high amenity places', *Journal of Leisure Research*, 36(4), pp. 580–606.

Steward, B. (2000) 'Living space: the changing meaning of home', *The British Journal of Occupational Therapy*, 63(3), pp. 105–110.

Stokols, D. and Shumaker, S.A. (1981) 'People in places: A transactional view of settings', in Harvey, J.H. (ed.) *Cognition social behaviour and the environment*. Hillsdale, NJ: Lawrence Erlbaum Associates, pp. 441–488.

Sudha, N., and Baboo, S. (2011) 'Evolution of new WARM using Likert Weight Measures (LWM)', *International Journal of Computer Science and Network Security*, 11(5), pp. 70-75.

Sviden, G., Wikstrom, B.-M. and Norberg, M. (2002) 'Elderly persons' reflections on relocating to living at sheltered housing', *Scandinavian Journal of Occupational Therapy*, 9(1), pp. 10–16.

Tinker, A., Hanson, J., Wright, F., Mayagoitia, R. E., Wojgani, H. and Holmans, A. (2007) *Remodelling Sheltered Housing and Residential Care Homes to Extra Care Housing: Advice to housing and care providers*. London: Kings College and University College London.

Thomas, J.C. and Carroll, J. (1984) 'The psychological study of design', in Cross. N. (ed.) *Developments in Design Methodology*. Chichester: John Wiley & Sons, pp. 83–95.

Thorpe, S. and Habinteg Housing Association (2006) Wheelchair Housing Design Guide (WHDG). 2nd edn. Publisher: IHS BRE Press.

Tognoli, J. (1987) 'Residential environments', in Stokols, D. and Altman, I. (eds.) *Handbook of Environmental Psychology*, New York: John Wiley and Sons, pp. 655–690.

Torrington, J. (1996) *Care Homes for Older People.* London: E&FN Spon.

Torrington, J. (2004) *Upgrading Buildings for Older People*. London: RIBA Enterprises.

Torrington, J. (2007) 'Evaluating quality of life in residential care buildings', *Building Research and Information*, 35(5), pp. 514–528.

Torrington, J., Barnes, S. and McKee, K. (2004) 'The influence of building design on the quality of life of older people', *Architectural Science Review*, 47(2), pp.193–197.

Treasury Taskforce (2007) *Technote 7: How to Achieve Design Quality in PFI Projects*. London: The Public Enquiry Unit HM Treasury.

Tuan, Y.F. (1974) *Topophilia: A study of environmental perception, attitudes and values.* New York: Columbia University Press.

Tuan, Y.F. (1975) 'Place: An experiential perspective', *Geographical Review*, 65(2), pp. 151–165.

Tuan, Y.F. (1977) *Space and Place: The perspective of experience*. Minneapolis: University of Minnesota Press.

Tuan, Y.F. (1980) 'Rootedness versus sense of place', *Landscape*, 24(1), pp. 3–8.

Tuan, Y.F. (2001) 'Introduction: Cosmos versus Hearth', in Adams, P., Hoelscher, S. and Till, K. (eds.) *Textures of Place: Exploring Humanist Geographies*. Minneapolis: University of Minnesota Press, pp. 319–325.

Ulrich, R.S. (1984) 'View through a window may influence recovery from surgery', *Science*, 224(4647), pp. 420–421.

Ulrich, R.S. (1986) 'Human responses to vegetation and landscapes', *Landscape and Urban Planning*, 13(1), pp. 29–44.

Ulrich, R.S., Simons, R.F., Losito, B.D., Fiorito, E., Miles, M.A. and Zelson, M. (1991) 'Stress recovery during exposure to natural and urban environments', *Journal of Environmental Psychology*, 11(1), pp. 201–230.

United States. Department of Justice (1994) 28 Code for Federal Regulation Part 36 ADA Standards for Accessible Design, [Online]. Available at: http://www.ada.gov/adastd94.pdf (Accessed: 3 February 2011).

Veitch, J.A. and Newsham, G.R. (2000) 'Exercised control, lighting choices, and energy use: An office simulation experiment', *Journal of Experimental Psychology,* 20(3), pp. 219–237.

Volker, L., Lauche, K., Heintz, J. L., and de Jonge, H. (2008) 'Deciding about design quality: design perception during a European tendering procedure', *Design Studies*, 29 (4), pp. 387-409.

von Neumann, J. and Morgenstern, O. (1947) *Theory of games and economic behaviour*. 2nd edn. Princeton: Princeton University Press.

Wahl, H.W., Fänge, A., Oswald, F., Gitlin, L.N., Iwarsson, S. (2009) 'The home environment and disability-related outcomes in aging individuals: what is the empirical evidence?', *Gerontologist*, 49(3), pp. 355–367. Walker, A. (2006) (ed.) *Understanding Quality of Life in Old Age*. Buckingham: Open University Press.

Walker, A. and Mollenkopf, H. (2007) (eds.) *Quality of Life in Old Age*. Dordrecht: Springer.

Walker, M., Orrell, M., Manela, M., Livingston, G. and Katona, C. (1998) 'Do health and use of services differ in residents of sheltered accommodation? A pilot study', *International Journal of Geriatric Psychiatry*, 13 (9), pp. 617–624.

Wallenius, J., Dyer, J.S., Fishburn, P.C., Steuer, R.E., Zionts, S. and Deb, K. (2008) 'Multiple Criteria Decision Making, Multiattribute Utility Theory: Recent Accomplishments and What Lies Ahead', *Management Science*, 54(7), pp.1336-1349.

Warren, C.M.J. (2009) *Who needs a Green Star?* [Online]. Available at: http://www.prres.net/Proceedings/.%5CPapers%5CWarren_Who_Needs_A_Green_Star.pdf (Accessed: 10 January 2012).

Weenig, M.W.H. and Staats, H. (2010) 'The impact of a refurbishment of two communal spaces in a care home on residents' subjective well-being', *Journal of Environmental Psychology,* 30(4), pp. 542–552.

Werner, C.M., Altman, I. and Brown, B.B. (1992) 'A transactional approach to interpersonal relations: physical environment, social context, and temporal qualities', *Journal of Social and Personal Relation*, 9(2), pp. 297–323.

Werner, C.M., Altman, I., Brown, B.B. and Ginat, J. (1993) 'Celebrations in personal relationships: A transactional/dialectic perspective', in Duck, S. (ed.) *Social context and relationships: Understanding relationship processes series*: Vol. 3, Newbury Park, CA: Sage, pp. 109-138.

Werner, C.M., Altman, I. and Oxley, D. (1985) 'Temporal aspects of homes: a transactional perspective', in Altman, I. and Werner, C. M. (eds.) *Home environments, Human behavior and environment:* Vol. 8, New York: Plenum Press, pp.1-32.

Whyte, J. and Gann, D. (2003) 'Design Quality Indicators: work in progress', *Building Research and Information*, 31(5), pp. 387–398.

Williams, D.R., Anderson, B.S., McDonald, C.D., and Patterson, M.E. (1995) 'Measuring place attachment: more preliminary results', in Freysinger, V. and Stokowski, P. (eds.), *Abstracts: 1995 Leisure Research Symposium*. Arlington, VA: National Recreation and Park Association, p. 78.

Willis, J. (1995) 'A Recursive, Reflective Instructional Design Model Based on Constructivist- Interpretivist Theory', *Educational Technology,* 35(6), pp. 5-23.

http://dcfw.org/media/casestudies/38/en/dcfw_case_study_summary_plas_y_mor.pdf (2003) (Accessed: 11 June 2013).

http://www.architectsjournal.co.uk/does-the-dqi-process-work/5205841.article (no date) (Accessed: 3 July 2009).

http://www.bdonline.co.uk/fraser-quits-ads-in-pfi-protest/3081147.article (2007) (Accessed: 14 June 2009).

http://www.breeam.org (no date) (Accessed: 19 July 2011).

http://www.buildingforlife.org/assessments (2009) (Accessed: 20 July 2011).

http://www.defendcouncilhousing.org.uk/dch/dch_infopage.cfm?KWord=PFI (no date) (Accessed: 7 June 2009).

http://www.designcouncil.org.uk/Documents/Documents/Publications/CABE/delivering-great-places-to-live.pdf (2009) (Accessed: 19 July 2011).

http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_082089,) (2009) (Accessed: 19 July 2011).

http://www.dqi.org.uk (2009) (Accessed: 10 July 2009).

http://www.dqi.org.uk/dqi/common/DQIRespondentGuidence.pdf (2009) (Accessed: 14 June 2009).

http://www.homesandcommunities.co.uk/hqi *(2009*) (Accessed: 16 July 2009).

http://www.mod.uk/NR/rdonlyres/933BD9BE-5053-4642-8D6F-16DFF8FEE36D/0/DEEP_user_guide.pdf, (2009) (Accessed: 19 July 2011).

http://www.mod.uk/NR/rdonlyres/E9EA71D4-248F-4692-B2EC-7FAAA3147369/0/deep_summary.pdf, (2009) (Accessed: 19 July 2011).

http://www.mod.uk/NR/rdonlyres/F7DBAF24-FC86-4A24-A10F-FE6798A03516/0/deep_eval_record.pdf, (2009) (Accessed: 21 July 2011).

http://www.pcko.co.uk/word/lang/en/2010/05/burry-port/ (2004) (Accessed: 10 June 2013).

http://www.pfcu.scot.nhs.uk/HomeEvents/Previous/25_05_08/AEDET250508.pdf, (2008) (Accessed: 19 July 2011).

http://www.selondon.nhs.uk/documents/1247.pdf, (2009) (Accessed: 19 July 2011).

http://www.shine-network.org.uk/?p=module_articles&aid=122 (no date) (Accessed: 7 June 2009).

http://webarchive.nationalarchives.gov.uk/+/http://www.defence-estates.mod.uk/publications/bdc/DEEP_Evaluation_Record.pdf (no date) (Accessed: 7 July 2009).

http://webarchive.nationalarchives.gov.uk/20110107165544/http:/www.buildingforlife.org/assessments (2009) (Accessed: 16 July 2011).

Bibliography

www.architecture.com (no date) (Accessed: 14 June 2009).

www.cabe.org.uk (no date) (Accessed: 14 June 2009).

www.cic.org.uk (no date) (Accessed: 14 June 2009).

www.constructingexcellence.org.uk (no date) (Accessed: 14 June 2009).

www.defendcouncilhousing.org.uk (2009) (Accessed: 19 July 2009).

www.dqi.org.uk (no date) (Accessed: 14 June 2009).

www.dti.gov.uk (no date) (Accessed: 14 June 2009).

www.ogc.gov.uk (no date) (Accessed: 14 June 2009).

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